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In This Issue—*Is Service Getting Away From the Dealer?*

MOTOR AGE

Vol. XL
Number 3

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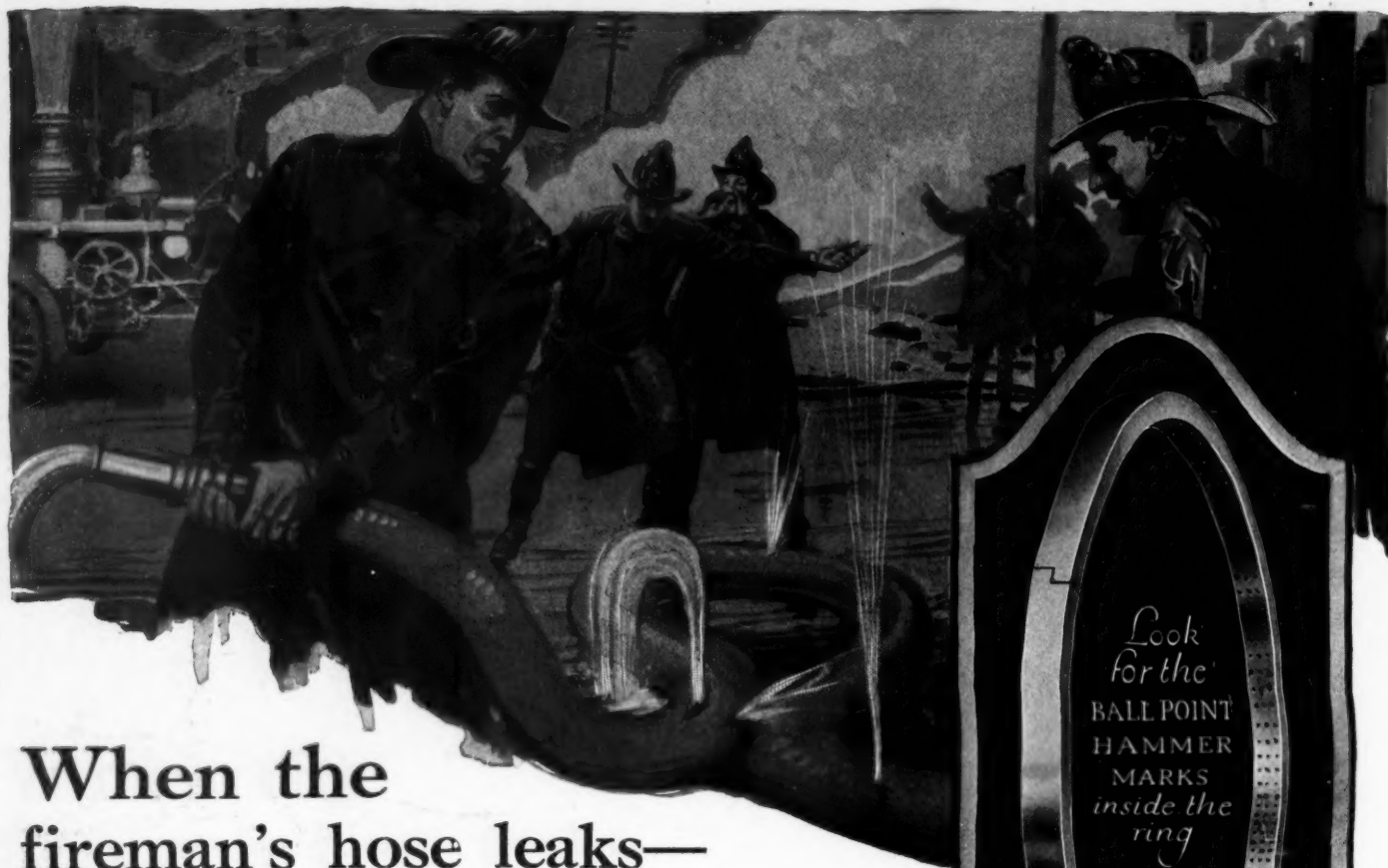
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—FRED DUNDEE

Motor Car Repairing and Machine Works
Portland, Ore.

MOTOR AGE

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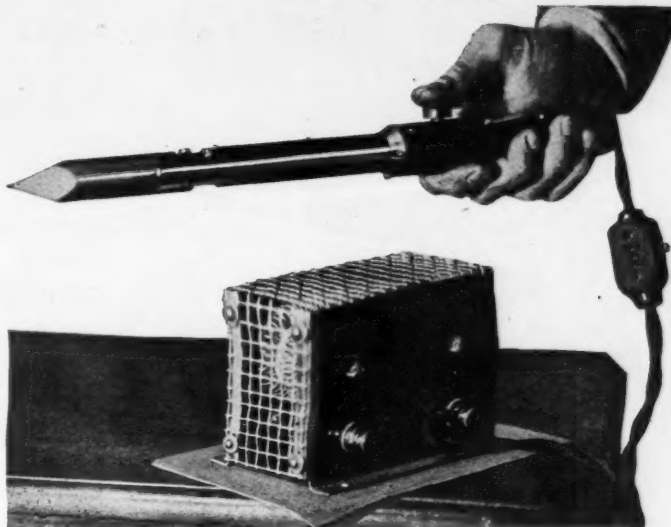
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The Baco Carbon Arc Soderwand puts the heat in the point, where you want it—and keeps it there.

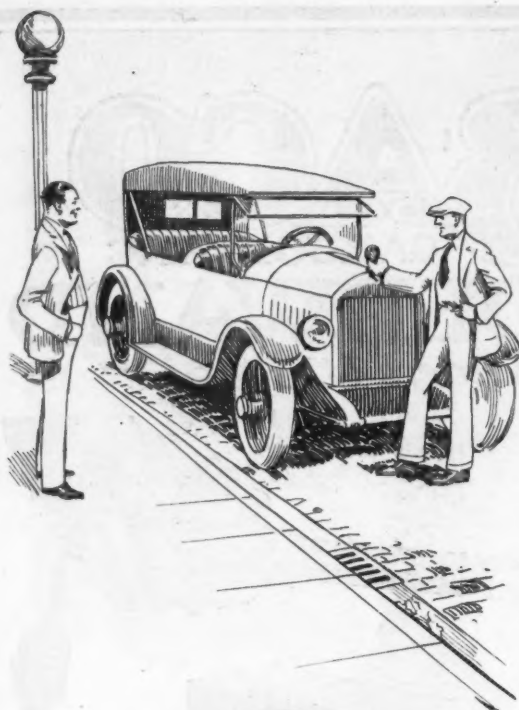
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Send today for literature and prices. You are losing money every day you are without a Baco Carbon Arc Soderwand.

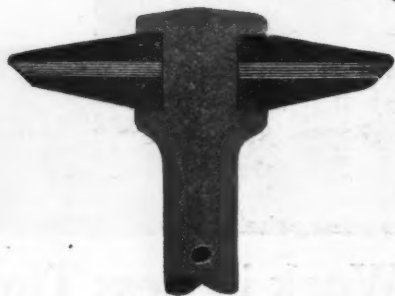
Baco Electric Company
Bode, Iowa



The Customer Said— "She Won't Take Hills On High" And The Dealer Said—

"It's valve trouble—leaking compression. You'll never get full power till you get tight valves because lost compression is nothing less than lost power. Let me put in a set of Flexedge Valves and then watch the difference. She'll show a lot of pep and take hills on high she wouldn't think of taking now."

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THIS IS A CROSS SECTION

Instead of being one solid piece, the head is made of laminations with heavy plates at top and bottom to give the necessary rigidity. On the closing stroke the edges of the laminations are flexed about 1/1000 of an inch—enough to free the face of the valve and the valve seat of carbon deposits. That's why Flexedge Valves always form a compression-tight seal.

Flexedge

VALVES You Never Need Grind

Valve trouble is one of the most common sources of complaint. If the valves are ground it helps for a little while but soon the valves become carbonized again and the same old trouble appears. The whole thing is a matter of compression. A carbonized valve will always leak compression—and when a motor leaks compression it leaks power.

Flexedge Valves always hold compression because they don't carbonize. They keep the seat bright and clean. They grind themselves while they work.

Install Flexedge Valves and win both profits and good will from your customers. Thousands of dealers and repairmen are finding that it pays.

See your jobber or wire or write for complete details.

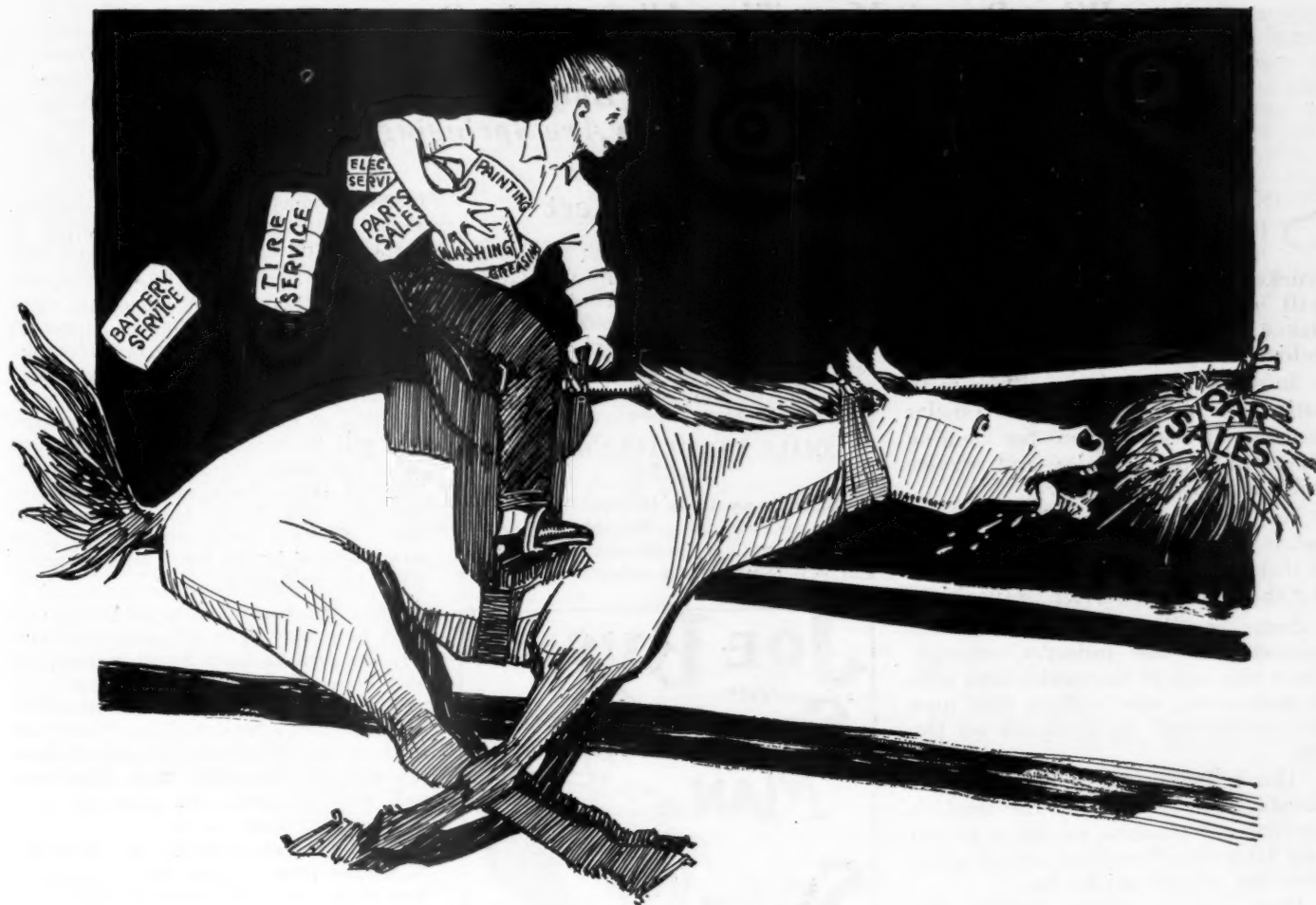


Self Seating Valve Company

340 W. Huron St.

Chicago, U. S. A.

MOTOR AGE



Maybe a New Hold is Necessary

THERE are some people in the industry to-day who say the service and maintenance end of the automotive business is slowly but surely getting away from the dealer. The dealer very often says he would be only too glad to confine all his efforts to sales and leave the repair work to someone else.

The question as to whether maintenance work is getting away from the dealer can be partly answered, at least, by the illustration above. Much of the tire work, electric, battery, chassis oiling and greasing, cylinder and piston work, etc., has been relegated to shops other than those of the dealer's service stations. The great numbers of automotive vehicles have been responsible to a great extent for this.

Specialization is partly the reason for

the change. The dealer hardly finds it profitable to compete with a tire service station, a battery service station or an "automobile laundry" which will wash and polish a car in short order while the owner waits, and at a comparatively low cost.

Still, a lot of dealers say service should be rendered by the concern which sells a man a car. There is excellent logic in this, just as there is logic in a dealer sending his electric work to a shop specializing in such.

It is becoming more and more realized that service is what makes sales, and sales are the dealer's bread and butter. If he can fatten sales by service perhaps it would be only good business judgment to get a new hold on some of the divisions of service before he loses them entirely.

Is Service Getting Away From the Dealer?

What Does it Mean That All Over the Country Filling Stations, Tire Repair Stations, Electric Service Stations, Oiling and Greasing Stations, Battery Service Stations and Parts Service Stations Are Springing Up?

SOMEONE has said that the time probably will come when the man who sells automobiles—or trucks and tractors for that matter—will not sell the service or maintenance work incident to keeping such vehicles in perfect condition.

In other words, there will be institutions for selling automotive vehicles and separate institutions for keeping them in repair. Sales and service will be divorced.

No persons, not even those directly connected with the industry can say at this time just what the future holds for the sales and service proposition.

Some excellent dealers, long connected with the industry, strongly favor the idea of the dealer who sells a man a car, also selling that man the service and repair work on the car.

The belief is that a customer thus satisfactorily treated by the dealer's service organization means a repeat sale later on of another car, or whatever the vehicle might be.

These dealers believe further that their service organization is a direct source of revenue, when correctly managed, especially when sales of new cars are not what they might be. Witness, North Dakota dealers who have stayed in business through several years of hardship, not because they sold cars, but because they repaired them. And, they turned their service organizations over to the repair of trucks, tractors, and other makes of cars than those they handled. All this was told about in last week's issue of *MOTOR AGE*.

Again there are dealers, successful dealers too, who say they believe it would be better for all concerned if sales and service were divorced. They would sell cars exclusively and leave the repair or service work to some other institution. They state that service work is not profitable, that they render it because they feel certain obligations to their customers; the factory insists, etc. They feel that the customer who has bought a car from them naturally seeks their place of business when some mechanical difficulty arises, or something else happens to their cars.

But some of them state, also, that it would be a wise plan for the dealer to

By B. M. Ikert

maintain some kind of light service department, which makes sure that the car is in perfect mechanical condition when delivered and which makes the few minor adjustments necessary for the first few hundred miles. But after that, they state, the customer might as well have repair work done somewhere else.

SHALL THE DEALER HANDLE PARTS?

But here again is the question of the parts to consider. Should the dealer stock up with a large number of parts and sell them to the customer when he

factory product; so why, the dealers say, should they load up with a stock of parts that tie up capital and might even prove a loss should they become obsolete.

Anyway, there are no immediate signs to show just what is going to happen in the years to come, but it is interesting to look back and see what has been done in the past few years as it applies to the question of divorcing sales and service.

It will be recalled that not so many years ago nearly every man who sold and repaired motor cars also sold gasoline and oil. That is, he had a filling station built on a small scale after those now operated by the large oil companies. What has happened?

Since the vast number of filling stations have opened up all over the country, the dealers have found it less and less necessary to have this branch of service a part of their business. Even some of the newer and larger service stations (dealer) have not added gasoline and oil dispensing units. They may sell gasoline—yes, but only in very limited quantities.

With lubricating oil it is different. Many car owners have the service station drain the crankcases of their cars and refill with fresh oil, and it therefore becomes quite necessary to have oil on hand. But even then it is safe to say the oil thus sold does not nearly begin to equal the amount sold by the curb filling stations. So in a sense we might say that the gasoline and oil business has become a distinct business from that of the dealer's service.

Again, take the tire business.

Several years ago automobile dealers all sold tires and tubes and in addition did a tire repair business. Some dealers naturally had a much larger tire business than others. But as cars and trucks grew in numbers there began springing up everywhere tire sales and service stations.


Except in a few instances it is uncommon to find these days dealers' service stations equipped to do a tire repair business on a large scale. The job of repairing tires has grown to be a business quite distinct from that of servicing engines and transmissions.

Even some of the very largest service stations in the country who formerly did tire work have given it up because it was felt they could not compete with the man down on the corner who made the sell-

JOE BUSH

The
SERVICE
MAN

SAYS—



D ON'T let all your serv-
ice work go. You
might find yourself a
"drift."

needs them? There is money in parts. Yet if the dealer sells parts, why not go a step further and get the job of installing those parts?

There also are those dealers who believe it would be best not to handle even the parts. Their idea is to have these distributed from some sort of central source, a source from which all service stations and shops could readily buy. These parts might include those made by recognized makers of replacement parts, of which there are at the present time many excellent concerns.

Often these parts are better than the

ing and repairing of tires his whole business.

Let us see what happened in the electrical end of the business. In the early days of the automobile, when starting motors and batteries were not used, the average dealer's shop could take care quite well of any electrical troubles. In those days a set of dry cells, a coil, a timer and a few switches made up the electrical systems, and once a man mastered these he was fitted to "shoot" most any sort of trouble.

But things have changed. Modern electric systems embrace so much that a man must specialize in them to know all there is about repairing the different systems. And the result has been that as automotive service in general grew in volume, there appeared other places of business whose sole work it was to look after the troubles and repairs of electric units.

In short electric service stations were established, and as time goes on we see more and more of these institutions springing up. Such institutions usually are fitted up with much elaborate equipment. It is necessary to do the work. The automobile dealer who runs a service station feels he cannot afford such equipment.

Perhaps, too, the volume of his electric work is so small he would not be justified in carrying an electrical department. What does he do? He farms his work out to an electric service station. Or, as is often the case, he simply refers his customers to an electric service station.

Take the case of storage batteries. For the most part there are very few dealers who maintain a battery department. They may have a small charging rack, but that is about all. They make no attempt to open up and rebuild a battery. That work is left to the battery service sta-

tion. Even towns of a few hundred population now boast of a battery service station. Often these battery service stations also do generator and starting motor work.

We have seen thus far, then, how the gasoline and oil business, the tire repair business and electric work has gradually been separated from the automobile dealer's service work, not so much through any fault of the dealer but through changing times.

Let us see what has happened in other branches of service. Chassis oiling is a good example. This is more or less messy work at best and for good results requires special equipment. In nearly every large city now one finds "oiling and greasing racks." Here the car owner drives his car up an incline or trestle work and a corps of men go over in short order the various units to be lubricated.

CHASSIS OILING, CAR WASHING AND REFINISHING NOW SPECIALIZED

The work includes draining and refilling the crankcase, rear axle, gearset, etc. The prices usually are reasonable and the result is that these places are well patronized, especially in view of the fact that the work can be done while the owner sits in the car and waits.

The same is true of washing stations. There are many of these in the country. They wash a car quickly while you wait, or while you do a little shopping. Ask any dealer who runs a service station and he will tell you car washers are hard to get and he would rather do without this kind of work.

The refinishing of automobiles, trucks and other automotive vehicles is a big part of maintenance work, but how many service stations run by the dealer operate such a department. Painting auto-

mobiles, rebuilding tops, re-upholstering, etc., is a line of work by itself and as in the case of tires, the electric system, etc., we find many independent shops given over to this class of work. Often the dealer makes some sort of arrangement with such a shop to do whatever work he may have.

Then there are those who are talking about service stations for the popular units used in many of the cars and trucks. Thus, an engine maker or a rear axle maker might be represented in a locality by a service institution whose work it is to provide parts and repair these units. For instance, a dealer would send to such a service station the engine of one of his customer's cars for overhauling. Another dealer who might be handling a car using the same make of engine would do likewise, and so on. This means a shop of this kind could equip much more elaborately than an individual dealer.

In looking over the question of the dealer's losing out on service, it must be borne in mind that local conditions are a big factor. One still can find many service stations to-day operated by dealers who do all classes of service work, tires, electric, etc.

In the smaller towns the dealer's service department must of necessity be an all-around shop and do a little of all the various kinds of work. It is in the large cities where one finds the specialized service stations.

Whatever the future holds, it is quite likely that the dealer always will have to render some kind of maintenance work on the product he sells. It is the one way he has of keeping in contact with his customers. Perhaps the time will come when dealers will get together in a community and establish a joint service station for electrical work, tire work, etc. It is something worth thinking about at any rate.

Here Is What Already Has Taken Place

1—Gasoline Filling Stations

THE tremendous increase in the use of automotive vehicles has resulted in the establishment all over the country of gasoline and oil filling stations. These, of course, are independent of the dealers' stations, so the dealers have found it less and less necessary to have this branch of service a part of their business.

2—Tire Service Stations

THE job of repairing tires has grown to be a business quite distinct from that of servicing engines and transmissions. Even some of the largest service stations in the country which formerly did tire work have given it up. Tire work is a specialized form of service these days.

3—Electric Service Stations

IN the old days when electric systems were simple, nearly every dealer could take care of electrical work. But things have changed. The modern electric systems are so varied and embrace so much that one must be a specialist to work in them. Hence, we have to-day electric service stations, the sole work of which is to look after the troubles and repairs of electrical units.

4—Oiling and Greasing Stations

IT now is possible for the car owner, especially in the large cities, to drive to one of these stations to have the oil in the engines changed, the rear axles, gearset or springs lubricated, and so on. These stations are equipped to do the work much faster and very often better than the dealer's service station.

5—Paint Shops

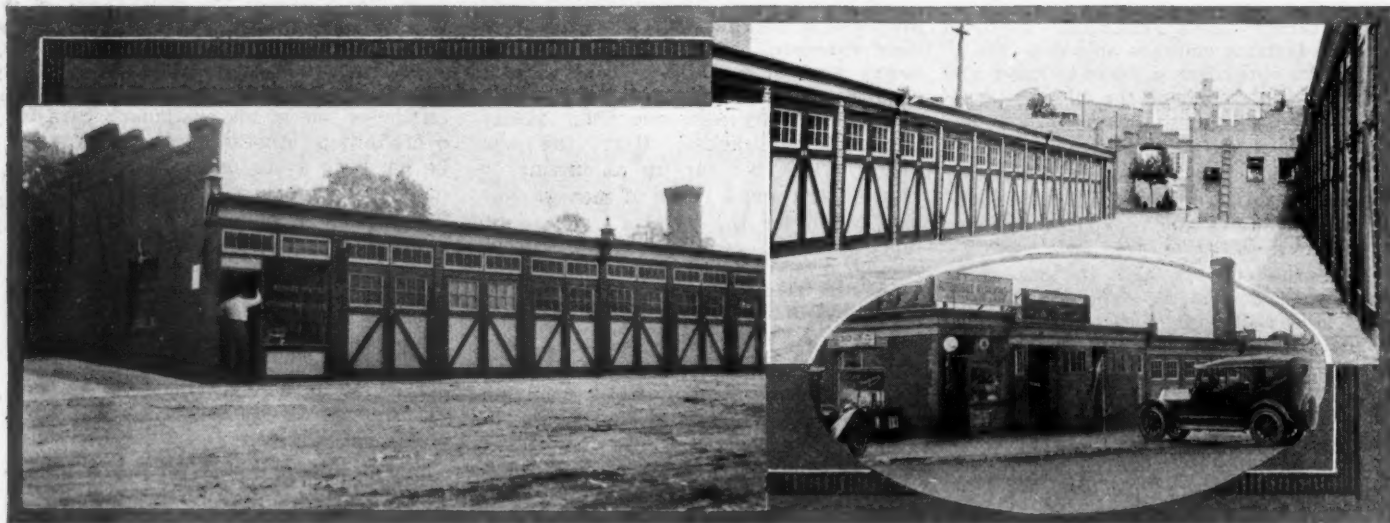
THE refinishing of motor vehicles is a big branch of service and as in the other cases cited, there are many institutions, other than those operated by dealers which specialize in the work. Most dealers say they cannot afford to add such a department to their regular service work.

6—Unit Service and Parts Service Stations

MANY are now talking about the establishment of service stations for the repair and maintenance work on the popular makes of engines, axles, gearset, clutches, etc. These stations would furnish the parts for these units also.

The Community Garage Pays Profits

Service Men, Battery Stations, Vulcanizers and Others Find Such Motor Centers Excellent Locations for Business



Community garage groups in Philadelphia. Here the car owner has all the advantages of a private garage, with additional ones. For instance, many of these institutions are heated, have running water, etc. A small service station takes care of the owners' wants, such as repairs, accessories, etc.

THE community or cluster garage has taken a firm hold on the motoring public and is rapidly increasing in number in eastern cities, notably West Philadelphia. This type of garage is sometimes launched as a mere speculation by the owner of a nearby residence or a real estate operator, but is generally started by an experienced garageman who knows just what he is doing.

As if by magic a motor center springs up—almost over night. Little buildings conforming in pattern and general structure to the one-story "stall" garages for individual cars, are erected in one or more rows. Ordinarily these buildings are of one story.

For decorative purposes the sides or tops of these buildings will be joined by arches of brick, the result being quite effective where there is a double row of garages, twenty or more to the row, as is often the case. Many rows have sixty individual garages, while others have as many as one hundred and twenty-five.

In connection with the establishment of a community garage, frequently a service station is founded, and vulcanizers, brazing and welding experts, accessory, oil, and gasoline dealers, battery agents, fender and radiator experts and general repairmen make their headquarters here. Oil company filling stations often locate near these clusters frequently becoming a part of the group.

The standard range of prices at which these individual garages are rented is from \$9 to \$12 a month. The housing shortage in Philadelphia gave the com-

Make that Vacant Space Pay

WHILE the community garage plan spoken of on this page is primarily confined to the very large cities, there may be something in it applicable to the smaller towns. Even in towns of 30,000 or 50,000 population there are many car owners scratching their heads for a place to keep their cars. The dealer in a small town who is not any too well blessed with sales of automotive vehicles right now, might give this community garage idea some thought. He might go so far as to partition some of his own building with material like plaster board into "stalls" for his customer's cars.

munity garage a great impetus, and as houses with garages are being built but slowly, owing to strikes, high prices of material, and money scarcity, the man with a group of garages to rent has almost invariably a profitable investment.

Among the advantages of the community garage to the customer are the following: his car is safely locked up and is accessible at any moment; nobody can "joy-ride" with it; he can keep his tools in the place and work on the car at his leisure; no inconvenience or delay is encountered in obtaining it for use, as is often the case in public garages; he

has about him experts in the various automotive lines whom he may conveniently consult.

The owner of the garage group and the proprietors of the service station or shop have the advantage of continuous patronage from a large area, and these patrons are almost invariably "good pay." Sometimes one of the shopmen can make a favorable arrangement with the owner of the cluster, allowing him a good sized discount on the rent of as many of the garages as he can sub-lease at the standard rates.

For example, in the case of John A. Lundgren who has the principal shop in a large motor village in Philadelphia, his shop is rent-free for the reason that he sub-lets at the standard rates four individual garages which he obtains at considerably less than those rates. The convenience of his location is a great advantage to him, for in his shop at one end of the row he vulcanizes tubes, sells two brands of tires, as well as general automotive equipment, gasoline, oil, the Alemite greasing system, fan belts and rubber hose, besides making general repairs. He not only enjoys the steady patronage of those who rent the individual garages but he draws general trade from four directions.

Another instance of the profitable handling of shop work for a community garage is that of George C. Paddle, who started by renting four garages, doing the shop work for the patrons, and now, within two years owns an airplane line in Atlantic City.



During the programs, Mr. Titus had the farmers in attendance photographed in front of his establishments. Following their return home, the farmers each received one of the photographs with the compliments of Mr. Titus

When the Farmer Starts Buying

Here Is One Tractor Dealer Who Is Sure to Get His Share of the Business Because He Is Making the Farmer Tractor-wise

IF there ever was a time for the marketer of farm tractors and power farming machinery generally to be optimistic, it is today. Only by waging a vigorous war on the pessimism that seems to have enveloped the farmers with the fall in the market prices of their products, will the dealer succeed in moving his merchandise. If the dealer is to relax his efforts and his energy, he is encouraging the continuance of the wave of depression. If he multiplies his efforts and energies and makes robust optimism the keynote of his business, he is not only bound to sell his goods but he is also doing a yeoman service in accelerating the return of general prosperity.

The above describes the spirit behind the unusually successful volume of business being done today by L. E. Titus, who has agencies for tractors in three towns located in the farming communities in western Washington (state).

Mr. Titus recently conducted free tractor schools, demonstrations and entertainments for western Washington farmers in Centralia and Olympia, two of the towns in which he operates. These programs typify the vigorous, two-fisted manner in which Titus is going after—and getting—business; also how he is supplanting pessimism and depression with optimism.

The first program was held at Centralia, and more than fifty farmers from miles around responded to personal invitations sent out through the mails or extended verbally by salesmen from the house. While the programs were held primarily to acquaint the farmers with the possibilities of tractor farming, the underlying purpose was to create a

healthy, optimistic atmosphere in the community.

After sessions at the Titus establishment for three days, given over to general discussions and lectures on mechanical features of the tractor, labor-saving and money-saving possibilities, minor tractor repairs, adaptation of various implements to the tractor, adaptation of the tractor to land clearing and other work, the program was concluded with an elaborate banquet at which the farmers were the honor guests. At this banquet the leading banker of Centralia, the president of the Chamber of Commerce, two prominent merchants, and heads of various departments of the tractor organization, made addresses. In all of the addresses the dominant note was optimism.

NO ATTEMPT MADE TO SELL

Titus paid all the expenses of the banquet held at Centralia and also for a similar banquet which concluded a similar program at Olympia, which was held following the Centralia affair and which was just as well attended and as productive of concrete results.

There were no blunt attempts to sell the farmers during the days of the programs. The farmers had been invited to come to inspect and learn about tractors, and incidentally to be entertained, and Titus is too shrewd a business man to have taken advantage of their presence by attempting to put them under any obligations. While the farmers were attending the classes during the school sessions, while they were going about the show rooms and the repair shops of the establishments, and during the banquets and the moving picture shows given for their entertainment, they were

being carefully studied for the "follow-up" campaign that was to be launched later.

Mr. Titus and the members of his sales force were endeavoring in every way possible to draw casually from their guests the nature of the objections they may have held toward the acceptance of tractors—not for the purpose of meeting these objections on the spot and turning the argument into a sales talk, but to be prepared with facts and figures when the salesmen later went out on the road and visited the farmers in their own back-yards, where Titus says, "farmers after all must be finally sold."

One of the chief planks in Titus' merchandising policy is to keep one eye out for prospects and the other eye on those who have already been sold. The follow-up methods religiously employed after a tractor has been sold are very thorough. The house sends out a tractor mechanic at regular intervals to call upon each owner of a tractor bought from Titus, for the purpose of advising with the owner and examining the machine to determine if any repairs are necessary. In addition, Titus stages moving picture shows at various points in his territory at regular intervals showing what farmers in other parts of the country are doing with tractors, on the theory that the farmers may be able to glean ideas from the pictures that will make their own tractors perform more profitably. To make the use of his moving picture machine possible in districts not served by a regular electric light company, Mr. Titus is having a large farm lighting outfit mounted on a truck to be used.



Better Mechanics for the Industry

How the Michigan State Auto School Is Training Men to Do Better Work in Automotive Shops—Course Embraces Many Subjects

THE Michigan State Auto School, Detroit, is fast becoming recognized for its effort to be of service to the employers of the automotive industry—the dealers, service men and manufacturers, as well as to the employees. Many dealers and service stations send men to the school for advanced training, or call on the school for graduates to enter their employ.

Arthur G. Zeller, president and general manager of the school says the course of instruction represents the combined plans and advice of leading manufacturers, their production engineers, service managers and others.

After an analysis was made of the results of questionnaires sent out by the Automotive Association of the Cleveland Chamber of Commerce to the service managers of all the factories asking them as to their opinions concerning schools, a new method of procedure was adopted, involving the alternation of explanatory theory with practical demonstration.

The instruction is arranged in the following divisions: 1—the chassis; 2—the engine; 3—ignition; 4—starting and lighting; 5—repairing and review. The outline of the new course is about as follows.

At the beginning of the course, lecture periods of one week alternate with shop practice in one week periods, to enable the student properly to pick up each new subject and thoroughly understand it. The lecture periods, however, are partly

practical. Automobile and engine parts and pieces of mechanism are passed around among the students, tests are made, etc.

After he has passed his examination in this lecture room, the new student goes to the chassis, or rear axle department

Automotive Schools

THIS is the second article of a series telling of the various automotive schools located throughout the country. Last week's issue contained an article in which were discussed the methods used by the Ambu Engineering Institute, Chicago, in making automotive electricians.

Next week we shall tell our readers of the way in which the School of Engineering of Milwaukee, another electrical school, carries on its work. The future will demand men highly specialized in their work and we believe the schools of the country will be a big aid in training men to render the highest type of service.

in the shop for one week, where he actually works on everything which he has had explained in the preceding lectures.

After successfully completing the work in this department, he goes to another lecture room, where he spends one week studying text on engines, after which he goes to the engine department in the

shop, where he tears down engines, grinds valves, scrapes bearings, etc. After the electrical demonstration classes the students are required to work on the electrical systems of completely equipped motor cars. They must re-wire them completely and test the system by running the car. The right hand view shows a student at work on welding a crankcase.

shop, where he tears down engines, grinds valves, scrapes bearings, etc.

The next step is to the lecture room for instruction on fundamental electricity, including ignition, which is followed by one week spent in the engine block test department, where the student works on engines, timing, setting the points of the magneto, adjusting carburetors, etc.

After a week of instruction in the more advanced electricity as applied to ignition, lighting, and starting, he goes to the electrical demonstration department, where he spends another week on the different ignition, lighting and starting systems. A part of this time is spent in the electrical laboratory, overhauling and repairing all makes of electrical apparatus.

A period of ten days is spent in the general repairshop, where among other things driving lessons are given.

The shop departments operate 8 hours a day. In addition, students may attend night sessions in some of the departments, if desired.

The newly arranged course includes several more days in the repairshop than formerly required. This is considered one of the most important, if not the most important branch of instruction. In the repairshop comes the final test to prove that the student can use what he has learned. Students are instructed that the more time they spend in the repairshop the better it will be for them. The enrollment includes a life

scholarship, and the privilege of staying as long as desired in any class.

Special courses in trades allied with the automotive industry are also given at the school. These include welding, air repairing, battery repairing and machine shop practice.

In the welding course the student gets complete training in structural and repair work on all metals, including aluminum, also brazing, and cutting. The course includes over 60 hrs. of individual handling of the torch. The student does not stand around and watch others work, but does the actual work himself. Forty individual welding outfits are available. This welding work is altogether separate from the other courses, as welding is treated as a trade in itself. Evening classes are offered, and are very popular with men who are employed, or are taking another course in the day time.

The tire repairing course offers complete training for operating a tire repair shop or for production work in a tire factory, not only covering the repairing of tires but tire shop management, and pointers on how to get business. It is separate from all other courses, and requires several weeks.

In the battery building and repairing course the student is given training and experience in battery service, and is

qualified to conduct a business of his own in this branch. This is a new course at the M. S. A. S.

The machine shop work course is designed to fit the student to increase his earnings as a machinist. It includes training on lathes, drill presses, millers, shapers, etc.

It is realized that the service station mechanic often is called upon to make certain parts for a car or truck when these parts are not available in the stockroom, or when it would require too much time to get them from the factory. For this reason, the school offers the course in machine shop practice. It is, for example, a decided advantage for a

service station to be able to turn up an axle shaft, a pump shaft, or similar part, when the car owner is anxiously waiting to go on, or when a truck must be put in commission for the next day's work.

One of the noteworthy things about the Michigan State Auto School is its full line of equipment. A glance at the accompanying illustrations will convince the reader of its completeness. In the engine test department, for instance, there is enough apparatus to do justice to a large factory. There never is any need for the students' being crowded around any piece of apparatus, inasmuch as there is plenty to go around.

Know Your County—Buy a Car

Here is a new thought which the dealer might emphasize in his advertising with good effect:

"HOW MUCH OR HOW LITTLE DO YOU KNOW ABOUT YOUR OWN COUNTY?"

"How high is the corn right now?"

"Where is 'Devil's Hollow,' and what is the shortest way there?"

"How far along is farm work?"

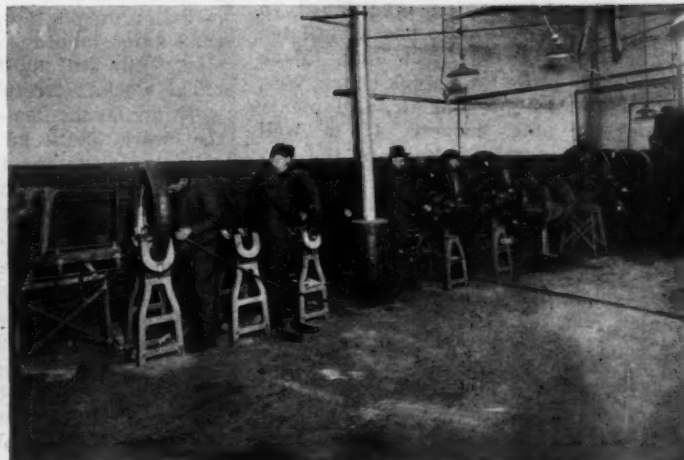
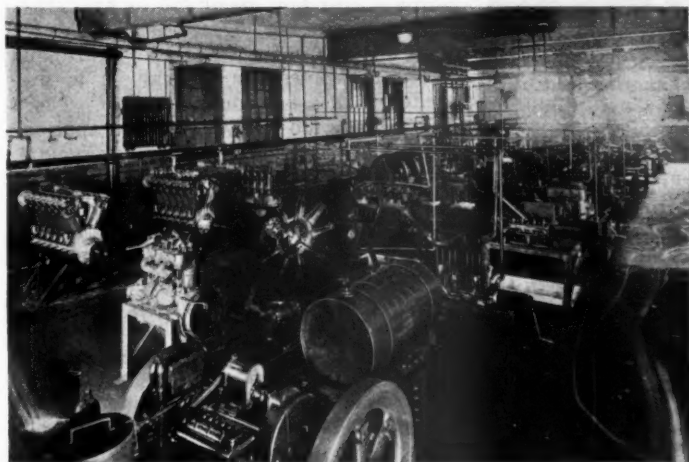
"Some people know all these things. Perhaps your neighbor is one of them."

The people who know these things and many other interesting and important things about your own home county are automobile owners.

"In other words, automobile owners are able to get out into the country and become informed concerning the things of the day.

"Don't you owe it to your family and to yourself to increase your general knowledge by buying a car NOW?"

A Photo Trip Through Some of the School's Main Departments



Above, left, engine test department. All types of engines are on the block for study, overhauling and operation. Below is shown the class in battery building and overhauling. Top, right, electrical demonstration department. Below, the equipment used in the tire repair department.

The SERVICE MANAGER

Speaks:

Proper Delivery of Work One of Essentials—Reception of Customers Deserves More Thought—Advocates Flat Rate System

THE most important factor in service is the proper delivery of work to the customer. The entire transaction may have been well handled in every detail, the customer may have paid his bill and may be satisfied in every respect; but, if upon getting in his car he finds a dirty seat, dirty steering wheel, grease on his car, or other evidence of carelessness, all of your efforts to please have come to naught. Too much emphasis can not be put on proper delivery of the car to the customer. It is not necessary to wash his car, but it should be cleaned.

In the conduct of the business of the service department, an important item is having proper facilities. A great many of us have an erroneous idea of what proper facilities are; in general they include proper tools, machinery, and equipment, sufficient clerk hire, good convenient arrangements, system by which customers' wants are promptly attended to and proper records made of them for future reference—all of these and many more items can be included in proper facilities.

Another very important item is efficiency on the part of the mechanics. In order to get the most efficient work from them, care should be taken to provide them with good working conditions. In our shop, each mechanic has a stall ten feet wide and twenty feet long. Each stall is equipped with a work bench, vice, natural gas, compressed air, and plenty of electric plug sockets. It is well lighted by natural daylight in the day time, and electricity at night. There is also a traveling crane which can be moved to any stall.

The machine shop is handy to all stalls as is the tool room and branch stock room combined. In addition to the mechanic's own tools, we furnish him with a special set of thirty speed wrenches. This set of wrenches is checked over each week, missing wrenches are replaced with new ones and the mechanic is charged with the lost tools. Each mechanic, when employed, is assigned a stall and as long as he is with us this stall is for his exclusive use. We also



Frank T. Sullivan, service manager for the O. K. Motors Co., distributors for Hupmobile and H. C. S., Louisville, Ky.

provide plenty of lockers and have a very nice wash room with shower baths, individual wash basins, plenty of hot and cold water, and running ice water.

STUDY MECHANICS' INDIVIDUALITIES

A great many of us are at fault in the handling of our mechanics. We will assume that each mechanic in our employ is a first class all around worker. However, a careful study of each one of them individually will show that this one is better on engines, that one better on rear axles, another better on transmission, while still another is better on electrical work. Careful distribution of the work to mechanics best qualified to do the work, will be productive of excellent results for the shop as well as the customer, and in this manner it will be possible to do prompt and efficient repairs at a minimum cost.

The proper reception of the customer should be given more thought. In a great many instances the service customer is handled in the following manner—

When he drives up to the service department he finds it crowded to such a degree that he cannot get in. This greatly aggravates him. Sales resistance number 1.

After numerous petty delays he is met by someone who has never been schooled

in salesmanship. Sales resistance number 2. Remember right here, this man is a customer coming to the place to buy something and he should be sold efficiently, on any item pertaining to service just as in the sale of an automobile.

He wants something done on his car, and after he has carefully explained his wants, he usually asks about what it will cost him. (How many articles do you yourself ever buy without first knowing exactly what it will cost.) He is usually answered: "Well I could not give you any definite estimate. We will charge you according to time and material used—or about so much."

He goes away with the idea that it will perhaps cost him about \$10 or \$15. If it costs him fifteen dollars it is fifty per cent more than the ten dollar figure, and when he comes for his car he is presented with a bill for \$25 or \$30. There are entirely too many about and approximate figures given and too few amounts. Sales resistance number 3.

Now about complaints. When a customer makes a complaint, it is neither right to try and justify it by immediately siding in with him against the service department nor to settle the blame on any individual. The first impulse should be to consult your records covering the transaction and make the most amicable settlement possible, at the same time letting the customer feel that everything is being done to please and satisfy him.

COMPLAINTS ADJUSTED THROUGH RECORDS

It is our policy in handling complaints always to get out the records covering the particular job on which the complaint is made. For instance—recently one of our service customers complained that he had just paid us \$125 to overhaul his car and now his transmission needed repairs. We immediately got out our records and showed him a complete itemized list of what we had done for the \$125 and he saw for himself that in the whole list there was no mention made of the transmission. He saw at a glance that he had no complaint and authorized us to overhaul his transmission and when this work was completed he paid his bill and went away perfectly satisfied.

After a careful compilation of statistics pertaining to the time required in the

performance of different repairs on every unit of the cars we handle, we arrived at a charge to the owner and a payment to the mechanic. We, therefore, are able to quote a flat price on over 75 per cent of the repairs we perform for our customers, and are also able to quote a flat price we will pay the mechanics to do the work.

On by-the-hour jobs we pay all the mechanics the same rate, however, in most cases which require the work done by the hour, such as wrecks, taking out rattles, etc., we usually contract with the customer and the mechanic. We pay our mechanics on a piece work basis entirely and only guarantee them a salary of \$20 per week. It is wonderful to see how they work. Instead of dragging a job out an hour or two longer than is necessary, they perform each and every job as fast as they can consistently perform it in an efficient manner, for it is our rule that the mechanic himself must guarantee his own work.

The foreman is also particular to see that the work is performed correctly, for he is paid a commission on each dollar we pay the mechanic for the work that is performed, while he is fined twice the commission paid on any work that is not

Service Managers

HERE is your opportunity to get a lot of things off your chest. You may or may not have some grievance against the business in which you are engaged, but at any rate here is a chance for all of you to sit around the table and talk over a lot of common problems. We feel sure that after you read what Mr. Sullivan has to say on these two pages that you will want to sit down and write us along similar lines. Remember, this is your department and you can say what you like. Have you any new thoughts on service? Tell us about them.

done correctly. Again, the tester is given a commission on each job of work tested and O. K.'d by him, and he also is fined twice the commission paid if he O. K.'s a job that comes back.

The mechanics like this method very much, for as a whole they are making

more money than on a by-the-hour basis. It also works out very nicely for us as we can definitely figure our cost to do the job. In working mechanics by the hour and charging a flat price, if the mechanic does the job in less time than is allotted it is our gain and the mechanic's loss. If he takes longer than the time allotted it is his gain and our loss. It has been our experience in working mechanics by the hour that it was usually his gain and our loss; so by transferring the burden of responsibility to him he does not waste any unnecessary time; however, he is careful in doing the work for he also realizes he must guarantee it.

Perhaps it appears that this method would only be worked out on the one make of cars that a dealer represents. We might mention the fact that our sales department purchases all of its supplies and labor from the service department at the same price as our customers; consequently, the service department has to perform the work on all the different makes of used cars we take in at the same rate of charges as is used in working on our customers' cars, and in the aggregate, it works out satisfactorily.

Vesper Buick Co. Opens New Maintenance Division Building

THE new maintenance building of the Vesper-Buick Auto Co., St. Louis, which was recently completed, marks a step forward in motor car maintenance.

Coming as it does just as the motor car is emerging from the throes of a somewhat exaggerated slump, this investment by the widely known Buick distributor in St. Louis, amounting to considerably more than \$100,000, is but an expression of faith and optimism in what the future holds.

The new building was conceived by Fred Vesper in his desire and effort to provide a fully equipped and up-to-date Buick maintenance service in St. Louis, and embraces an area of 21,000 sq. ft. of floor space, with a service yard to the side of 10,500 sq. ft.

The building is devoted entirely to maintenance.

It represents a departure in automotive architecture, being an adaptation of the Spanish colonial style. The exterior walls are covered with white stucco over

brick and all the trimmings are terra cotta. A tower on the corner gives the building distinction, and its interior is illuminated at night by an arc light.

The equipment of the new building is of the most modern type. Time and labor saving devices have been installed to facilitate repair work. Two hundred thirty feet of bench space provides ample room for the forty mechanics, and the benches face large windows, thus receiving ample daylight. Along the benches are sixteen electric sockets where portable lights or power drills may be attached.

A compressed air washer has been installed so that a car may be thoroughly washed, both body and chassis, in but a fraction of the time required to do the work by the old method. Pressure for this washer, as well as for the inflation of tires and for the operation of compressed air hoists is supplied by a large automatic air compressor driven by a 30 hp. motor.

A machine for "running in" overhauled engines is another feature of the equipment of the new building. This machine is driven by a 30 hp. electric motor.

In addition to these unusual features, power drills and lathes form a prominent part of the equipment.

Modern conveniences have been installed for the workmen, such as shower baths and individual steel lockers. The shower baths are supplied with hot water by an automatic Ruud water heater.



This is the new maintenance building of the Vesper-Buick Automobile Co., St. Louis, Mo. The building was conceived by Fred Vesper in his desire to provide a fully equipped institution for his customers

Federal Brings Out 5 to 6-Ton Truck

Uses a New Continental Four-Cylinder Engine, 4 $\frac{3}{8}$ by 5 In. Truck Is Made in Three Chassis Lengths with Wheelbases of 163 In. and 187 In. Electric Equipment Complete

THE new, heavy duty, 5 to 6-ton rated capacity Federal truck is distinguished throughout by oversize parts and by a powerplant which is 25 per cent more powerful than the units in the former 5-ton truck put out by this concern, the Federal Motor Truck Co., of Detroit. The new truck costs \$5,350.

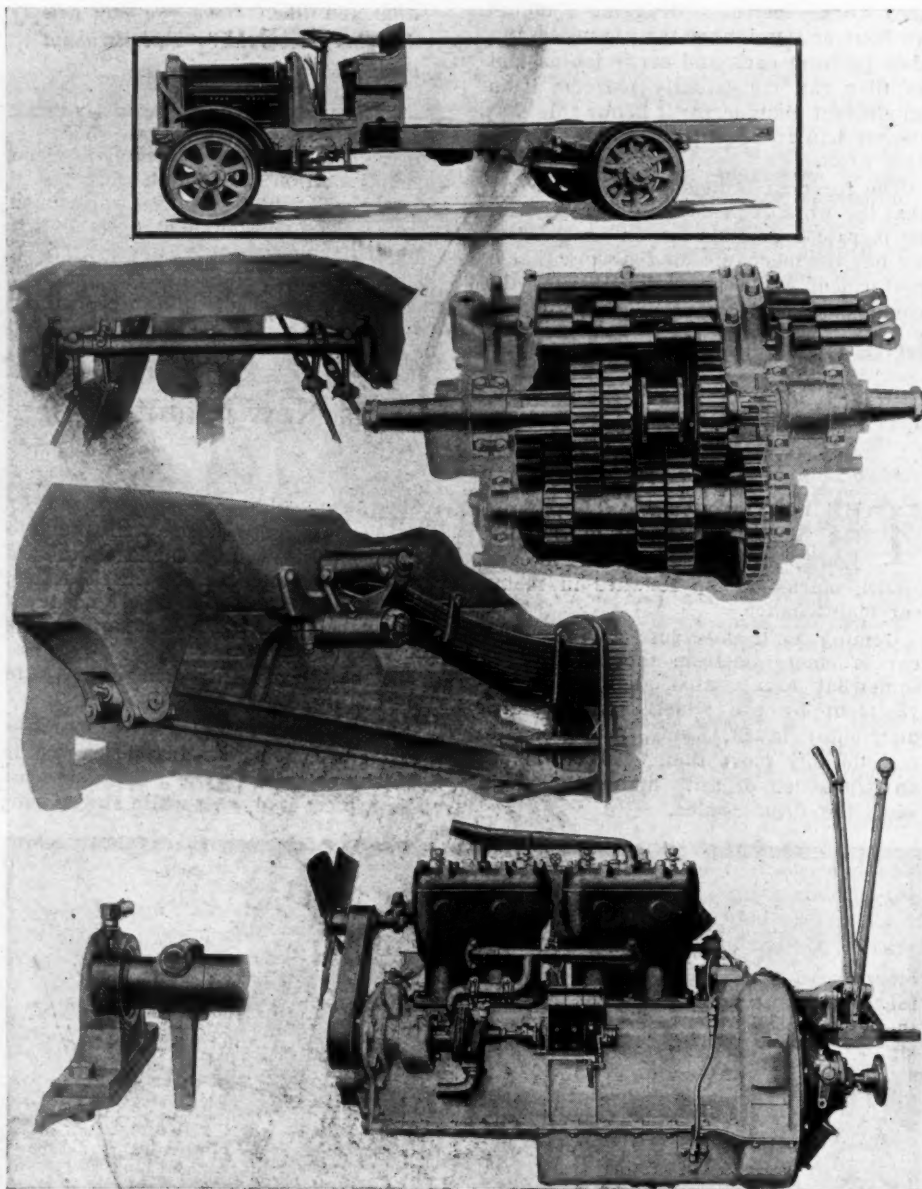
Its engine has a displacement of 425 cu. in., as compared with 350 cu. in. on the former model. It has a removable cylinder head in place of the fixed cylinder head, larger crankshaft bearings, a full pressure feed oiling instead of circulating splash, electric lights and horn in place of oil lamps and a hand horn, and provision for electric starter, should same be desired. It also has a 14 in. clutch in place of a 12 in., larger diameter propeller shaft, a heavier frame, a heavier transmission, with a reduced reduction in the rear axles and increased reduction in the transmission, thereby attaining greater speeds in high gear without sacrifice of power in the lower gears. The new truck is also better fitted from the standpoint of equipment, being provided with four towing hooks, vacuum feed in place of gravity and a hubodometer as standard equipment.

The engine used is the first production of a new Continental model. It has been designed particularly for severe and heavy work, being a four-cylinder, 4 $\frac{3}{8}$ by 5 in. design, developing 50 hp. at 1100 r.p.m. The S. A. E rating with this bore is 36.1 hp. The cylinders are cast in pairs.

The end thrust of the crankshaft is taken on the front bearing to allow for unequal expansion between the shaft and the crankcase, and also to provide an adjustment for end play. The reciprocating parts are machined for balance, both the pistons and connecting rods being of extra length to reduce side thrust.

The gear train at the front of the engine consists of four gears instead of the conventional three. The use of the idle gear between the cam and pump gears and the crank gear makes it possible to distribute the location of the accessories such as the pump, generator, magneto, etc., so that they may be accessibly installed.

Cooling is provided for by a centrifugal water pump and the mounting of the pump is so arranged that there is ample room for taking up and replacing of worn packings.



Top view shows the new Federal 5 to 6-ton chassis. The other views are close-ups of the transmission, radius rod and spring, left side of engine, and details of the brake shaft.

Full pressure feed oiling is secured by a geared pump, which is driven by spiral gears from the camshaft, and the thrust on the pump shaft is taken by suitable shoulders against a bronze bushing carried in the crankcase.

The oil pump is primed automatically

and draws oil through a strainer in the oil pan. From this pump oil leads run to all the main bearings and the timing gearcase. The crankshaft is drilled to supply oil to the connecting rod bearings and an oil duct carries the oil from the lower end of the connecting rod to

the piston pin bearing at the upper end. An oil pressure adjusting valve is built into the engine and the oil level in the oil pan is determined by the use of the conventional bayonet or sticktype of gage.

Ignition is provided by an Eisemann, high tension, model G4 magneto.

The clutch is a Borg & Beck of the single dry plate type, similar to that used on all Federal trucks. On this truck, the driving disks are 14 in. in diameter. There is an opening on the side of the transmission case, through which, by removing a plug, the transmission

may be filled with oil. This is a distinctive feature on the Federal truck.

The truck is made in three chassis lengths with wheelbases of 163 in. on two of them and 187 on the third. The two with the 163 in. wheelbase have loading spaces respectively of 130 in. and 154 in. The 187 in. wheelbase chassis has 190 in. loading space. These trucks all have the same overall length of the frame, 222 in.

In the way of electrical equipment, the 5 or 6-ton model is equipped with a generator, 6-volt battery, two electric side lamps with diffusing lenses and electric tail lamp. A feature of the equipment

is the mounting of the tail lamp and the license plate on the rear frame in such a way that the latter is illuminated by the white light of the tail light in conformity with the law in several states.

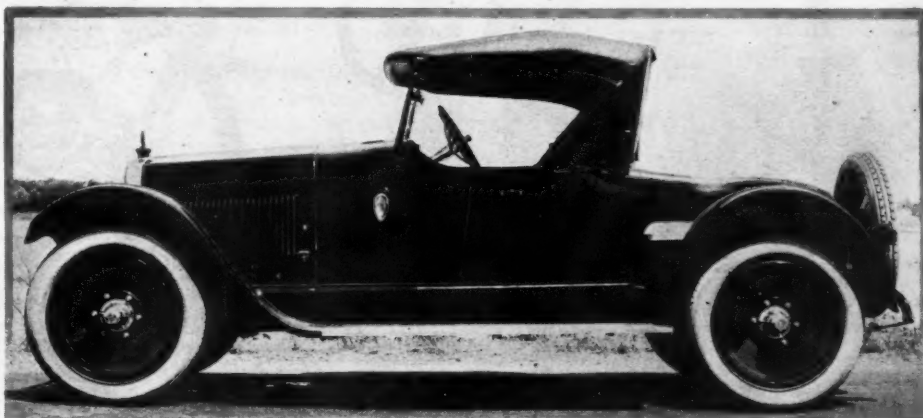
The axles are Timken type mounted on Timken roller bearings throughout. On the front axle, the rear eye of the front spring is slightly lower than the front eye, thus providing a caster effect. The rear axle is a full floating worm type Timken, with a ratio of 10 1/4 to 1 as standard. The standard tire equipment comprises 36 by 6, front, and 40 by 6 dual rear; 40 by 12 Giant pneumatics can be provided at extra cost.

Wills Sainte Claire Adds Four-Passenger Roadster to Line

THE Wills Sainte Claire roadsters are now in production and the cars of this model are already getting into the hands of purchasers. The roadster body is mounted on the standard chassis with a wheelbase of 121 in. All of the distinctive Wills Sainte Claire features are preserved in this model and several new ones added.

The roadster seats four passengers comfortably, two in the front seat and two more in a rumble seat of novel design. This is covered by a hatchway which is made in two sections connected by a hinge and which folds back to form the rear of the seat and, when not in use, folds flush with the rear deck. The seat is thickly upholstered in leather.

The front seat is designed to provide abundant leg room. The compartment under the front seat, has been extended, and with the rear compartment provides considerable space for baggage. The standard colors provided are Lady Mary maroon, Newport blue and Liberty green. Other colors and color combinations may be secured upon order at an advance in price. The radiator, hub caps and side



Four passengers can be comfortably seated in this new Wills Sainte Claire roadster. The price is \$3,275, which is \$75 more than the touring car

or courtesy light are nickel plated on the roadster.

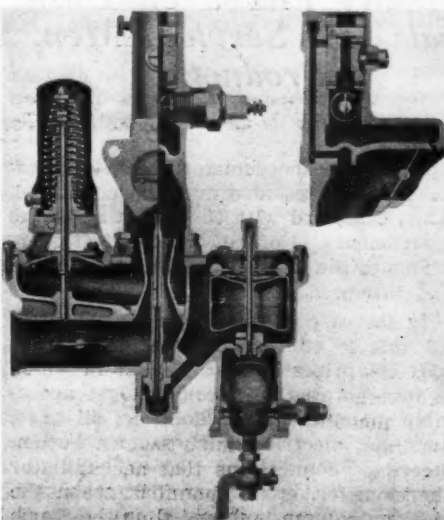
Like the touring car, the roadster is equipped with disk wheels painted to correspond with the body. A spare wheel and tire carried on a rack at the rear are furnished. A top of special de-

sign fully equipped with curtains comes with the car. The price of the roadster is \$3275 f. o. b. Marysville. This is \$75 more than the touring car. Coupe and sedan bodies for the Wills Sainte Claire line are now under construction and will shortly be on the market.

Two Stage Carbureter for Packard Six

THE Packard single sixes with a two-stage or double jet carbureter, are now appearing. Utilized in combination with the fuelizer, it is claimed that this carbureter greatly increases the gasoline mileage possible with the single six cars. The carbureter is designed to give automatically a mixture to suit the needs of either heavy or light pulling. The new two-stage carbureter is being supplied on all the single sixes at present, and is being provided without charge as rapidly as possible for cars already in service.

According to the claim made by the Packard company, the ordinary carbureter will develop its best service either when a car is idling or when it is pulling wide open, as on a heavy grade. In order to accomplish its result, it works at a richer mixture than necessary in ordinary pulling. The two-stage jet carbureter is designed to take care of this situation automatically; that is, it is

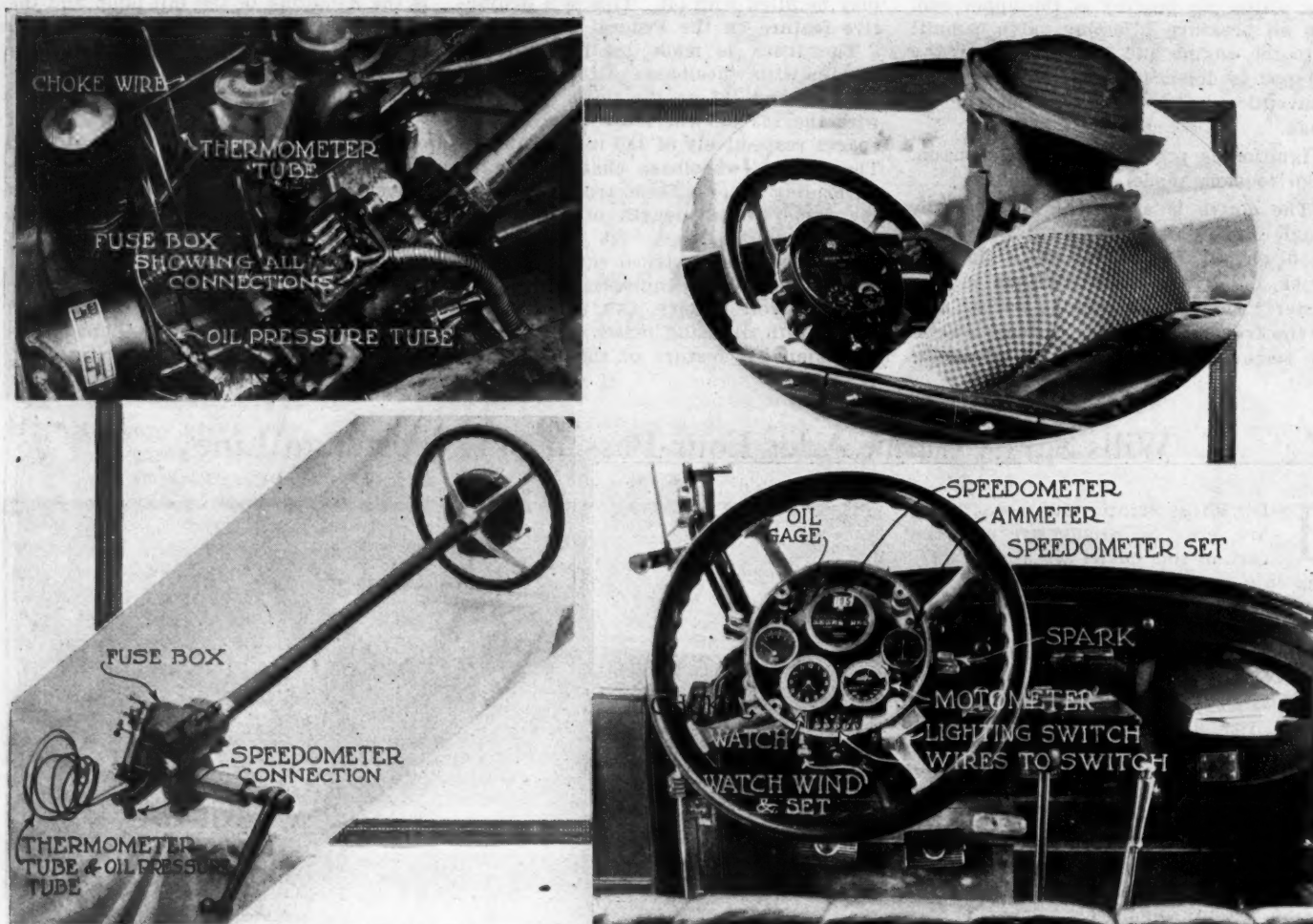


Sectional view of improved two-stage carbureter on Packard single six

designed to give a rich mixture when it is needed and a leaner mixture for ordinary driving.

This is accomplished by having two jets. The one for the richer mixture is placed so far above the medium speed jet that it will not work during ordinary running but will respond to high suction from the engine which is created by a heavy pull.

As shown in the sectional view of the carbureter herewith, the ordinary jet utilized for general driving is the annular passage located at the throat of the venturi. The secondary jet is the central tube which extends upward into the mixing chamber of the carbureter above the venturi. This being away from the venturi naturally is at a point where the velocity head is considerably lower and consequently the jet is not in operation at ordinary speeds. Furthermore, as the jet is considerably above the level of gasoline in the float chamber, considerable pull must be exerted to lift the gasoline from this jet.



Various views of the Whyte Motor Control. Accessibility is one of the salient features of the device. Any of the instruments readily can be taken out for inspection or replacement by merely removing the cover. A small screwdriver is all that is needed

Whyte Motorcontrol Simplifies Chassis

Comprises Steering Gear Incorporating Full Quota of Instruments Usually Placed on Dash. Accessibility Feature Appeals to Service Men. Speeds Car Production

THE elimination of body wiring, dispensing with the mounting of instruments on the dash, reducing the job of wiring a chassis and body to a single operation are among the salient features of the Whyte Motorcontrol, recently introduced to the industry by the Whyte-Duffield Mfg. Co., Chicago.

Those familiar with the present conventional construction of automobiles know a large amount of wiring has to be done on bodies in order to connect the dash board control and the instruments on the board with their corresponding mechanisms on the chassis. The service men, especially, know that when a body is placed on a chassis the body and chassis wiring must be hooked

up, and the speedometer shaft, oil pressure gage, etc., also must be connected. This, combined with the mounting of the instruments, is one of the costliest operations of the motor car factory and service station.

In the case of the Whyte Motorcontrol all this is eliminated, inasmuch as the unit comprises a steering gear in which is incorporated in a compact yet accessible manner the speedometer, oil gage, ammeter, electric switches, horn button, steering connections, clock, radiator thermometer, etc. Therefore, when the steering column is mounted on the frame the only connections that need be made after the body is mounted are at the bottom of the column, where the body

wiring is brought up and connected to the fuse or junction box of the Whyte Motorcontrol. This can be done under conditions where a man is not hampered by lack of space in which to work.

UNIT COMPACTLY DESIGNED

From the illustrations it will be noted how compactly the unit has been designed. Even running the wires, oil tube, speedometer shaft, choke wire, water temperature tube, and spark and throttle rods through the column has not increased the diameter of it over the usual columns.

Accessibility has been one of the chief aims in designing the unit. By taking out four screws at the back of the case,

the cover can be removed, exposing all instruments and all wiring back of them. Each instrument can be taken out individually by removing the screws which hold it in place. The small light which illuminates them can be slipped out at the back of the case without removing the cover. The wires going through the column are of a different color and thus can be identified for connecting at the top or bottom. Inasmuch as all wiring is protected by a steel tube in the column there is no chance of a breakdown in any of the circuits. Any circuit, by the way, can be tested by merely wiring around it from the fuse box to the connections on the switch. The same key which locks the switch also locks the fuse box cover.

The unit has been designed from the viewpoints of the car manufacturer, the production department, service department, engineer, dealer and the owner.

For the manufacturer it means a vast saving of floor space by the elimination of body wiring and instrument assembly departments. The company also states it will cost the car-makers no more than present equipment. This of course, depends on the quality of instruments desired.

For the production department it means an acceleration in the speed with which connections can be made at the base of the column.

To the service man it means greater accessibility and a consequent cutting down in the time required for service

operations. It places the wires in a protected position and it also avoids the soiling of upholstery or marring of the body of the car by careless workmen.

As the control unit is not revolutionary, there is no sales resistance—a good point for the dealer.

For the car owner, the unit places the control where it is visible and convenient. It permits the use of the dash for curtains, tools, gloves, etc.

The control must of necessity be handled as a manufacturing proposition only and for the time being will be confined to cars in the high price and medium price class. The unit will be manufactured and shipped as a complete unit to the car or truck makers.

Presto Rim Tool Facilitates Tire Work

THE opening and closing of a rim very often becomes quite a problem in the service station unless good equipment is handy.

To meet the demand for a universal rim tool that would take care of the demands of the service station and car owner, the Presto Rim Tool has been brought out by the Shelby Tool Co., Shelby, Mich. The tool for the service station differs only from that furnished

to force a "break" in the rim when necessary. If the rim is one that opens straight, without expanding, and the casing is not rusted on, a quick downward stroke of the handle furnished with the tool will open or break the rim, and a continuation of the movement completing the circle with the handle in the position shown in one of the other illustrations will telescope the rim so the casing can be removed.

In replacing a rim it is put inside the casing and the handle of the rim tool pushed slowly backward as far as the spring of the rim will allow it to go. The handle is then released and the rocker moved up close to the pivotal rocker, allowing the tool to fold up. Then both hands are used on the handles in forcing the rim back into position. This is shown herewith.

The tool is well made and should prove a decided time-saver in the shop, to say nothing of an energy-conserving for the mechanic. The tool is equally well adapted for rims like the Kelsey, which have to be slightly expanded before "breaking." In extreme cases where it is impossible to expand the rim with the tool a screwdriver can be driven into the split of the rim until the dove-tails are disengaged. The procedure is then as with an ordinary rim. The tool costs \$4.50. The type with hardened rockers costs \$6.00.

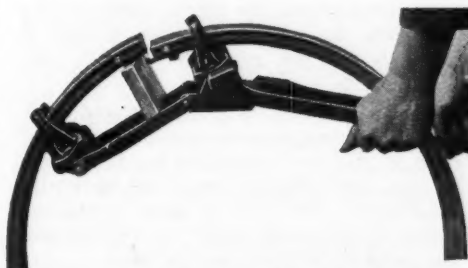


Rim contracted with tool in locked position

car owners in that the corrugations of the rockers have been treated and hardened to prevent wear.

The makers state it is possible to exert a pressure of from 1,500 to 2,000 lbs. upon the rim in contracting or expanding it. It can be attached or detached from a rim in 10 seconds. There are no bolts or nuts for adjusting. The rocker grip tightens as soon as traction is applied to the handle in either direction. When folded it make a package 2½ in. by 7 in. by 8 in. Inasmuch as the tool catches the rim on both flanges there is no danger of the rim buckling.

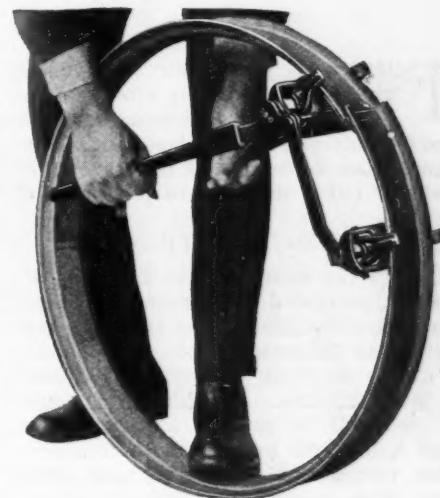
The illustration at the bottom of this page shows in general the application of the tool. The block of wood is used



Forcing the break in an ordinary rim with aid of wood block

DURANT DEALER BODY GROWS

New York, July 16—Chiefs of the various divisions of Durant Motors were here last week for conferences with Durant



Manner of operating tool when replacing the rim

on questions of general policy. Among those in New York for the meeting were T. W. Warner, Edward Ver Linden, who will have charge of the main Durant plant at Lansing, and D. A. Burke who developed the Sheridan. Preparations are being made to get into production in the eastern territory by Aug. 1.

Rapid progress is being made in building up a dealer organization, particularly in the east where the work is under the direction of M. D. Leahey. Dealer relations are being established in the central territory by Ver Linden and on the west coast by E. M. Steves, general sales manager for Durant Motors of California.

WHITES CELEBRATE ANNIVERSARY

Cleveland, O., July 16.—Windsor T. White, chairman of the Executive Board, and Walter C. White, president of The White Company, were tendered a dinner recently by the branch managers who met in annual conference to celebrate the twentieth anniversary of the White brothers in the manufacture of motor vehicles. All of the branch managers from the United States and Canada were present, together with a few invited guests.

David Beecroft, President of the Society of Automotive Engineers, and Directing Editor of the Class Journal Co., spoke on some future aspects of the industry.

Practical Tire Merchandising and Repairing

by Stanley P. McMin



Installation and Care of Air Compressors

Choosing a Compressor
Proper Pressure to Carry

Storage Tank Capacities
Belts and Belt Speeds

Determining Pulley Sizes

THE choice of an air compressor should be made only after mature deliberation and consideration of every requirement of the business. This applies not so much to the type and make of outfit but more to the size and style.

CHOOSING A COMPRESSOR

One of the most frequent mistakes of the inexperienced tire merchant is to purchase a compressor too small for the volume of business. This undoubtedly is due in no small measure to the cost of the equipment. Nevertheless an outfit that will be entirely adequate even after a business has grown to considerable volume will cost but very little more than an outfit too small.

Unless the compressor capacity is sufficient it will be necessary very soon to get rid of the outfit and get a larger one and the expense in the end will be far greater than if one big enough were obtained in the first place.

For the average service station it will hardly be necessary to use a water-cooled compressor. Air cooling is adequate unless the compressor is operated almost continuously or at least for very long periods each day.

Air-cooled compressors under heavy duty are likely to heat up too much. This heating is bad for the compressor and it also reduces the capacity of the storage tanks because heated air is pumped into them and when this air cools it contracts and the pressure drops considerably.

PROPER PRESSURES TO CARRY

For large service stations or those where a considerable volume of work on pneumatic truck tires is done, the slightly added expense of a water-cooled compressor will be well worth while. Such an outfit is very little more complicated than the air-cooled type, the only additional care required being the filling of the water reservoir.

It is entirely possible to carry pressures up to 200 lbs. or higher, but this is hardly necessary. If pressure is maintained at possibly 150 lbs. this will be sufficient for almost every requirement. However, it is important to bear in mind

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that the tank pressure must always be quite a bit higher than the pressure at the outlets.

Generally, tank pressure should be about 15 lbs. higher to allow for loss in piping due to air contraction, friction in the pipes, etc. The amount by which tank pressure exceeds pressure at the outlets will be determined very largely by the number of outlets and the length of piping and probably will have to be determined by experiment. After it has been determined, the safety valve on the air tank, or whatever other means is used to control pressure, can be adjusted quite easily.

In the interest of economy and lowered operating expense and in length of time it will be necessary for the pump to run, two factors must be carefully considered. The first of these is the capacity of the pump itself and the second, the capacity of the storage tank.

STORAGE TANK CAPACITIES

If a compressor that is too small is chosen it will be found necessary to operate it almost constantly in order to maintain a sufficient volume of air. The same applies where the storage reservoir

is too large for the capacity of the pump.

With regard to the capacity of storage tank best suited to a definite size of compressor, no hard or fast rules can be laid down. It is best to be governed by the recommendations of the manufacturer.

Maker's claims regarding compressor output vary to a considerable extent and not all such data are reliable. In a series of tests recently concluded it was found that the table of tank capacities given herewith is approximately correct. The tire under test was a standard size 35x4½ fabric that had been used for some time. After inflating to 85 lbs., the indicated number of tires of this size there will still remain in the tank from 90 to 95 lbs.

Tank	Size	200	180	160	140
		lbs.	lbs.	lbs.	lbs.
20 gal.	14x30	4	3	2	1½
32 "	14x36	6	5	4	3
40 "	16x48	9	8	6	4
50 "	16x60	12	10	8	6
65 "	18x60	15	13	10	8
80 "	18x72	19	17	13	10

BELTS AND BELT SPEEDS

Where a considerable volume of repair work is done and power is required for other machinery, it may be desirable to run the compressor from the existing line-shaft. This practice is recommended only where the power is used to a considerable extent. Otherwise it will be found necessary to start and stop the power equipment more frequently than their use ordinarily may necessitate and for this reason the cost of operating the pump may be considerably higher than if a self-contained, automatic outfit were used.

The satisfactory operation of the compressor depends considerably on the installation; and for this reason a great deal of attention should be paid to sizes of pulleys, to belts and other matters of this nature.

In general, the width of the belt should be precisely the same as the width of the driving pulley supplied on the compressor by the manufacturer. If an attempt is made to use a narrower belt, nothing but trouble will result. Belts will constantly stretch and break, will jump the pulley and set up a whip-

ping action that in time will be disastrous to the compressor bearings. The belt that is too wide will not operate properly.

Leather belts are better than fabric belts. It is simpler to lace them and they will improve with use under a careful application of a limited amount of good belt dressing. Fabric belts are difficult to lace properly.

The compressor should never be operated at speeds greater than recommended by the manufacturer. If run too slow, the capacity will be greatly reduced. If run too fast, they will overheat and possibly over-oil.

DETERMINING PULLEY SIZES

If a self-contained compressor outfit is purchased it will operate at its proper speed, but if it becomes necessary to install a compressor that will operate off line-shaft, care should be taken to see that pulleys are the right sizes to give the proper belt speeds.

Where compressors are driven direct from an electric motor, the pulley on the motor should not be smaller than 3 in. in diameter. A smaller pulley will result in belt slippage and a large one will require a compressor pulley that is too large. To determine the size of compressor pulley multiply the speed of motor pulley and divide the result by the number of revolutions of the compressor.

Example: What size compressor pulley is required to drive an air compressor at 340 R. P. M. direct from an electric motor having a 3 in. pulley and running at 1700 R. P. M.

$1700 \times 3 = 5100 \div 340 = 15$ in. pulley on compressor.

When it is desired to drive a compressor from a motor by means of a countershaft to ascertain the countershaft pulleys, multiply the speed of the motor by the diameter of its pulley and divide by the desired speed of the countershaft (a countershaft can run at any speed up to 500 r. p. m.) and this gives the speed and size of the driven pulley on the countershaft. Then multiply the recommended speed of the compressor by the diameter of its pulley and divide the result by the speed of the countershaft for the size of its driving pulley.

Example—It is desired to drive an air compressor, having a 9 in. pulley, at 350 r. p. m. by a motor having a 3 in. pulley and a speed of 1700 r. p. m. The compressor cannot be driven direct from the motor and a countershaft must be used. What size pulleys must the countershaft have?

$1700 \times 3 = 5100 \div 425$ (speed of countershaft) = 12 in., size of driving pulley.

$350 \times 9 = 3150 \div 425$ (speed of countershaft) = 7.4 in. The nearest commercial pulley is 8 in. Therefore an 8 in. driving pulley is used on countershaft.

In next week's article Mr. McMinn will cover the following points: the necessity of a firm compressor foundation; locating the compressor to insure accessibility; short pipes saving of air; importance of pipe size, and location of air outlets. In future articles he will discuss: the repair department; equipping a shop; tube repairing, and fabric tire repair.

Wiring and Piping of Air Compressor Outfits

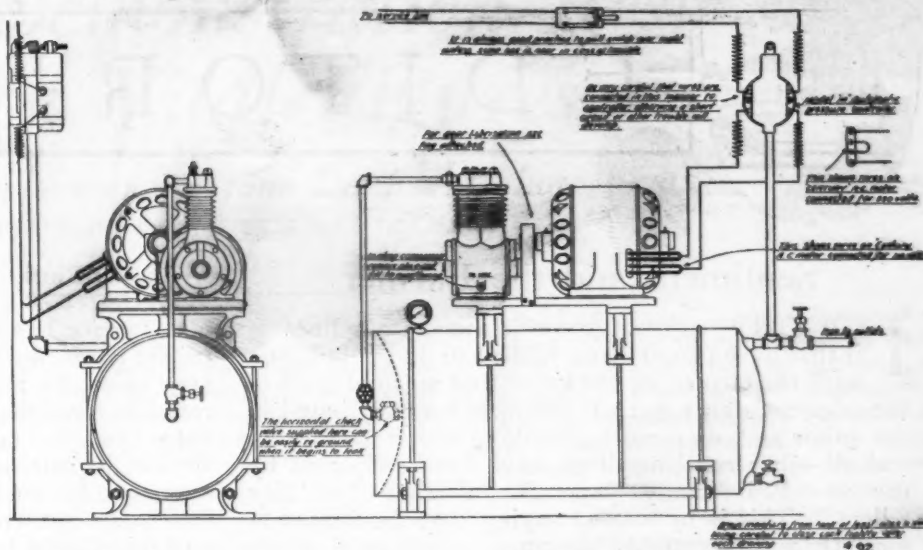
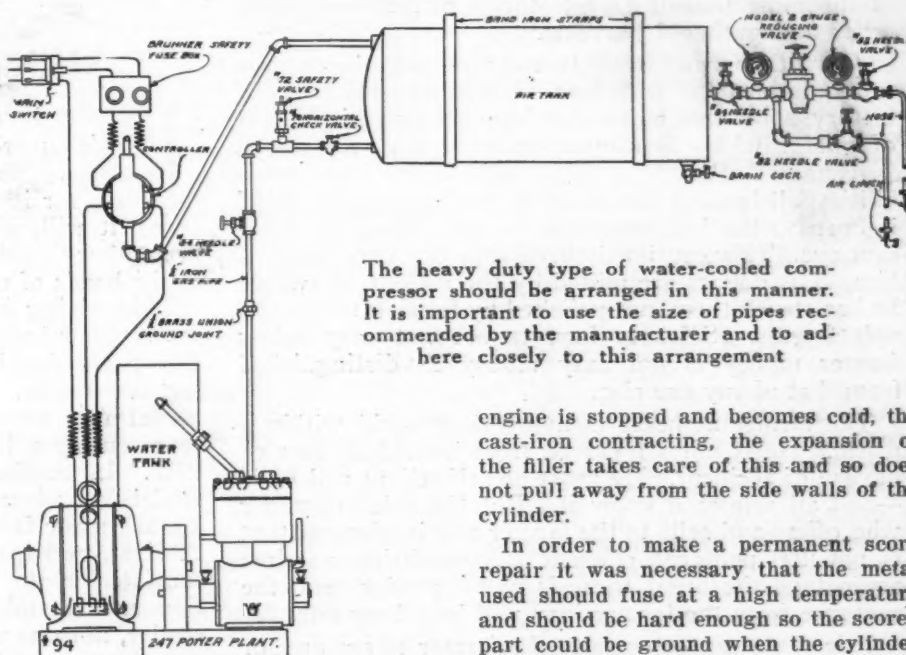


Diagram showing the proper method of wiring and piping a self-contained compressor outfit. It is very important to follow the instructions shown above, as well as those printed on the reverse side, and a satisfactory installation will result.

This drawing shows the proper method of wiring and piping a self-contained compressor outfit



The heavy duty type of water-cooled compressor should be arranged in this manner. It is important to use the size of pipes recommended by the manufacturer and to adhere closely to this arrangement

engine is stopped and becomes cold, the cast-iron contracting, the expansion of the filler takes care of this and so does not pull away from the side walls of the cylinder.

In order to make a permanent score repair it was necessary that the metal used should fuse at a high temperature and should be hard enough so the scored part could be ground when the cylinder was ground, without the metal filling the grinding wheels.

This metal is applied with large soldering coppers heated to a cherry red, so that the metal thoroughly amalgamates with the cast iron.

It also was found necessary to practice to develop a system of locking the molten metal in the sides and bottom of the score so it was mechanically held with a strong grip.

The company will lease the process to all repair shops and cylinder grinders in good standing everywhere and thus enable them to repair scored cylinders and cracked water jackets in their own shops at a saving.

The process is called the Bulldog Process. To make use of it a shop must provide itself with the Bulldog score repair outfit and the Bulldog metallic filler. Both are made by the Metal Repair and Supply Co., Inc., Washington, D. C.

New Process for Repairing Cylinder Scores

CRANKCASE oil dilution due to low gravity fuel has resulted in much damage being done to cylinder walls in the way of scoring. If these scores are deep, they must be filled, or the engine ceases to function properly. Engines thus repaired will operate as successfully as an engine fitted with a new set of cylinders.

A patent was recently granted for a process of repairing scored cylinders without pre-heating or welding.

The metallic filler used will stand the high temperatures developed in water cooled jackets and the penetrating effects of the gas.

The metal used possesses the feature of expanding when cooled, and when the



EDITORIAL



Sentiment and the Farmer

INDUSTRY may not know it but certain lines of it that have planned and wished to do big business with the farmer should know that no small part of the sales resistance to their products is firmly based in the unfair and often cruel ridicule to which the farmer, and all other rural dwellers, have been subjected by the so-called "funny papers," published by "city fellers." This is by way of saying that the farmer is honestly and thoroughly human.

First and all the time he is of the soil, but this means, too, that he is of the flowers, the sunshine, the clouds, the golden grain and always the central figure in the most beautiful of Nature's pictures—growing crops and gathered harvests.

Know the farmer in his true environment before you try to do business with him. Police records, financial history, show that he has not been the exclusive buyer of gold bricks. Sentiment so pure that we call it "greenness" rules him. He is a man of the finest sensibilities, all leading him toward gentleness. His mind is open to the best you have to offer him, but he is cautious. This caution is bred into the very bone of him. His dollars are milled by the rocks from which he has struck them, not polished by fleeting touches of soft fingers. Sales to farmers are not easy sales; farmer money is not easy money as distinguished from that of any one else.

The farmer at home is living in a world within a world. He is miles removed from immediate service in case of accident. He must be self-reliant and he is—and all salesmen know it. But the sales manager who offers and sells to the farmer any implement that is not 100 per cent efficient is committing a crime against all the merit there is in his product and the sentence from the farmer jury will be a long one.

It is of no consequence to the farmer to see one, or many idle horses at peace in the pasture field. There are times when such a sight is a real pleasure to him. But where is the farmer who can calmly behold an idle implement; idle, because it will not work efficiently from one cause, or from many. Sentiment, pure sentiment! To understand it you must know that horses are part of the farmer's life. He played with them as colts, he broke them to halter, to harness, to harrow. What of the implement? Here again you must know much of the farmer's life, his work, the uttermost of fatigue and physical pain in it, and his dollar, which is born of his labor.

For all the horse's weaknesses, the farmer has learned to depend upon him. He is aided and abetted in his love for his horse by his wife and his children. Childhood and colts! Who will say what pleasant and lasting pictures do not live in the farmer's mind of this combination? Foolish? You think so?

Perhaps the farmer has grown skeptical—thick-headed? No, wise. He has had to pioneer his own enterprise. O yes, we have tried to help him. We say

we have. But how does that aid appear to the farmer? Self-directed, square at ourselves, in nearly every case. The farmer has a green memory and he remembers patent gates, flocks of them, that would not close nor stay open; he remembers hedge fences, planted in rows, but which grew as forests in the middle of his fields; yes, the farmer remembers. He has moved so far out in Missouri that his barn is in Kansas. To overcome his resistance—sales resistance—the farmer has to be shown. None but perfected implements, and this should be especially true of self-powered machines, should ever be imposed upon the farmer. He can not afford to experiment. You lose his friendship when you ask him to buy on faith.



Misrepresenting Used Cars

THERE is a condition arising in the industry which merits condemnation in the most caustic terms. Unless it is speedily recognized and measures for its suppression taken by reputable concerns, it will, without the shadow of a doubt, result in another "used car situation" such as put gray hairs in the heads of many dealers a few years ago.

This crying evil is the misrepresentation of used cars. Four instances of glaring breaches of faith in this particular have been brought to notice in the last few weeks. In two of these the date of the car's model was advanced two years, the window signs representing a 1914 model as a 1916 and a 1915 as a 1917. In another case a French car of a very early model was advertised as having an English engine of a make made famous by its recent racing records, and the last, perhaps the most flagrant violation of trust, consisted in the dealer advertising a hybrid contraption as a standard car of an early model, when in reality, not one unit of it, from front to rear axle had ever been used by the manufacturer whose product it was represented to be.

When the four dealers guilty of these shady practices were pinned down to the truth they took refuge in the lame excuse that they had accepted the original owner's statements regarding the machines when they were traded in. They expressed no preference between the terms knave or fool, to one of which they were certainly entitled. For who will for a moment believe that they did not know the ages and major features of the machines when they accepted them in trade?

If they did know, the former appellation is apropos. If they did not know the milder epithet applies and they are to be pitied. But, in either case they and their ilk constitute a menace to the future welfare of the industry and should be driven out of it. If they are not, the confidence of the public in used cars, which has been built up by long, expensive, tedious efforts on the part of reputable dealers, will be again destroyed and the industry's second "used car situation" will be the bitter fruit.

Tractor Demonstration Results Lack Vital Figures

*Average Performance Alone Does Not Show Real
Efficiency of Machines in Farm Work*

CHICAGO, July 18—Official results of the 3-day tractor demonstration held at Fargo, N. D., June 28, 29 and 30, have been issued by the committee of the National Implement & Vehicle Assn. having the work in charge. The issuance of the report was delayed because the horse outfits which were competing with the tractors had not completed their work until some days after the tractors had finished.

The demonstration consisted of each tractor plowing and cultivating a 10-acre tract of land in the black level gumbo areas adjacent to Fargo. The temperature was very high, thermometers registering over 100 deg. Fahr. during the day, which made it particularly hard on the 12-horse outfits, seven of which withdrew. Of the 37 tractors that competed, one was disqualified, due to breaking a gear.

The results are not very complete and show only the numbers of gallons of gasoline or kerosene needed in plowing and cultivating per acre and also the time required to do the work. The figures are not given for individual tractors, but only averages for all tractors. There were 36 tractors that completed the demonstration, and of these 25 burned kerosene and 11 burned gasoline.

AVERAGE FUEL COST LOW

The average fuel consumption for the 25 that burned kerosene in plowing 10 acres amounted to 3.01 gal. per acre. Kerosene was worth 11.8 cents per gallon at Fargo, so that the kerosene cost per acre was 35.518 cents. To this should be added gasoline which was used by most of them in starting. Approximately .12 gal. of gasoline per acre was used, which at a cost of 23.1 cents per gallon gives a cost per acre of 2.772 cents for gasoline. Adding this to the kerosene cost gives an average of 38.29 cents per acre for fuel for the 25 kerosene-burning tractors.

The cost for the 11 tractors which burned gasoline showed that they used 2.77 gal. per acre in plowing, which at 23.1 cents per gallon gave a total cost of 63.987 cents per acre. It will be noted that the average amount of gasoline was less than kerosene, but the cost of gasoline being approximately double that of kerosene made the cost per acre approximately double.

It must be borne in mind that the

NOTHING but average performances of the tractors in the recent Fargo demonstration are given in the report of the committee of the National Implement & Vehicle Assn. which prepared the report on the tests.

More details, because of the rules governing the tests, will not be made public for several months. When this information is compiled and published, data of great interest and value will be placed before both makers and users of tractors. The present report lacks such important details, for instance, as the number of plows pulled by the competing tractors. Other data of equal value are also purposely omitted. These facts are not lost to the industry, however, and will be forthcoming just as soon as the rules of the demonstration have been complied with.

above figures represent average fuel consumption of the 25 kerosene-burning tractors in one case, and the 11 gasoline-burning tractors in another case. Two other sets of averages were given in the report, as follows:

No. 1—The average of all of the tractors constituting the best half of the group, that is, those that would be above the average figures already quoted.

No. 2—The average of the six tractors giving the lowest fuel performance.

The figures for the No. 1 group show considerable improvement over the average of all the tractors, in that the 25 burning gasoline averaged 3.01 gal. compared with 2.87 for the first. This gives a fuel cost per acre of 36.24 cents, as compared with 38.29 cents per acre in the general average.

When the No. 2 group is considered, that is, the fuel economy per acre of the six best performing tractors, greatly improved results are shown, the average kerosene fuel consumption being 2.51 gal. per acre instead of 3.01 gal. per acre for the entire group. The fuel cost per acre plowing by the six best performers was 30.56 cents per acre, with kerosene used as a fuel and gasoline used for starting purposes.

The three averages summarized as follows:

	Cost per acre
No. 1—General average (kerosene).....	38.29c
No. 1—Best average (gasoline).....	63.98c
No. 2—Best half average.....	36.24c
No. 3—Best six average.....	30.56c

Figures on lubricating oil consumption were given, but Motor Age greatly doubts the value of such figures, due to the

difficulty of getting figures on engine oil consumption that admit of comparison where different lubricating systems are used. There is also the difficulty of accurately measuring oil consumption over such a short period. The problem of crankcase dilution also is a factor that should be considered in connection with lubricating consumption report.

After each tractor had plowed its 10 acres, it was required to cultivate by means of disk harrows, spike tooth harrows, seed drills, and in some cases other farm equipment. This work was done immediately after the plowing was completed and a record was kept of the fuel used and the length of time required. For the four divisions given below the cost figures for fuel are:

	Cost per acre
No. 1—General average (kerosene).....	16.92c
No. 1—Best average (gasoline).....	29.56c
No. 2—Best half average.....	16.11c
Best six averages.....	12.60c

This summary shows that the best six had a fuel consumption at least 25 per cent better than the average of the 25 in No. 1 classification using kerosene.

TRACTOR SAVES MAN-HOUR COST

The committee in charge endeavored to give some report on the time required in doing the work, and the figures given out are in the form of man-hours per acre, that being an effort to arrive at the man-cost plowing per acre as compared with plowing per acre by horses. In the four classifications the number of man-hours per acre are given in the following tabulation, and the man-cost per acre are reckoned on a wage of 40 cents per hour is also given:

	—Per acre— Man- Man- hours cost	
No. 1—Gen'l avg. (kerosene) 94c	37.60c	
No. 1—Best avg. (gasoline) 95c	38.00c	
No. 2—Best half average..... 95c	38.00c	
No. 3—Best six average..... 84c	33.60c	

On a basis of a 10-hour day, this puts the workman's wages at \$4 a day.

Owing to the information not being given out as to the number of plows drawn by the six best tractors in the No. 3 group, it is impossible to arrive at conclusions as to whether the six best were machines pulling three, four, six or eight plows. The only figures are averages.

The report gives some figures on the five horse outfits, each of which plowed and cultivated 10 acres. Unfortunately, the figures are not given separately for plowing and cultivating, so that no comparisons can be drawn with the tractor classifications. They show the amount of

Concluded on page 30

Reduced Price Stimulus Is Holding Up Through July

Chicago Dealers Declare Future Business Promises Good Under Hard Work Cure

CHICAGO, July 18—The stimulus of reduced prices, which began to exert its full force early in June, when car sales in the Chicago territory went from a low level to a high and satisfactory plane of sales volume, has carried on through the first three weeks in July with very little if any loss. Perhaps the most encouraging feature in the Chicago territory is the fact that country sales, while dull at the present time, are beginning to pick up. Dealers in the small cities, within the last few days, are reporting many inquiries and a few sales. This is taken as almost revolutionary when compared to the conditions existing in the rural markets not more than a week or two ago.

It is difficult for dealers to adjust themselves to present conditions. They are still thinking in terms of war-time sales with a tendency on their part to exaggerate present sales. This tendency to report almost-sales as sales has no effect on bookkeeping nor financial reports. Perhaps it does keep up courage and force a sale tomorrow, but with all these things taken into consideration, business here is not better than fair.

Prospects are Very Good

Each line that has had the advantage of reduced prices, for a week or two, has enjoyed a great boost to sales. The peak in these cases with the exception of three or four where sales are continuing at record proportions, has soon passed, leaving sales above the old level but far below the high kick of the first reduced price.

There are hundreds of buyers out of the Chicago market at the present time because of vacation time, and this is true more or less of every distributing point whether large or small; but with this great drain on the potential market there are more prospective buyers in Chicago today, judging from the number of visitors and inquiries along automobile row, than there has been at any other time within the last three months.

With business as it is in the various organizations, there is a dominant spirit of optimism present everywhere. Dealers are awake to the fact that sales are not going to come easily. The new spirit pervading the industry was voiced five times today to MOTOR AGE from amongst 25 dealers whose opinion was sought—"There is good business for any high-powered sales force. Sales mean work—work as we have never known it before. Price is not so important."

The used car market, excepting in a few instances, is reported dull. There is a strong tendency on the part of prospective buyers to offer their own terms when dickering for a used car. Enough

dealers have weakened to these terms to give the market a bad tone.

About the only machine in the truck market that is active today is the mis-sold truck that is found on the legal highway on its way to and from the courts. These trucks are being taken away from owners after first and only payments and are coming back to dealers. The individual truck buyer is out of the market. Any little business that is being done in trucks is between dealer or manufacturer, and fleet owners.

The tire trade continues good and accessories are moving satisfactorily.

Quotes Bible in Road Signs

UNIONTOWN, Pa., July 16—Instead of the usual danger signals at points in the mountains that require careful driving of motor cars, there now have been placed scriptural warnings. No one seems to know their source. The signs are wooden ones, 3 ft. by 2 ft. At the most dangerous curves on the national pike between here and Cumberland are warnings, "Prepare to Meet Thy God," and similar cheerful quotations from the bible that have an appropriate bearing.

CASE LOWERS PRICES

Racine, Wis., July 16—Effective July 1, the J. I. Case Threshing Machine Co. made reductions in the price of its cars ranging from \$400 to \$500. The new prices compared with the old are as follows:

	Old	New
7-pass. tour.....	\$2650	\$2250
4-pass. sport.....	2650	2250
4-pass. coupe.....	3400	2900
7-pass. sedan.....	3750	3285

KISSEL NAMES LOWER PRICES

Hartford, Wis., July 15—Effective today the Kissel Motor Car Co., has made a second reduction in the price of its cars since last fall. The new prices represent a reduction of \$500 on all models and this amount added to the adjustments of last fall for the total reduction on models is given in the following table together with the old and new prices:

	Old	New	Red.
Custom-built			
Standard tour.....	\$3475	\$2475	\$1000
De Luxe speedster.....	3775	2975	800
De Luxe tour.....	3775	2975	800
De Luxe tourster.....	3775	2975	800
De Luxe coupe.....	4575	3775	800
De Luxe sedan.....	4575	3775	800
De Luxe urban-sed..	4950	4150	800
De Luxe coach-sed..	4575	4075	500

HAWKEYE TRUCK REDUCED

Sioux City, Ia., July 15—Prices on Hawkeye trucks have been reduced from \$265 to \$645. The 1½-ton is cut from \$2365 to \$1850; the 2-ton, \$2915 to \$2650, and 3½-ton, \$4345 to \$3700. The company reports a gradual increase in business.

Treasury Tax Program to Contain but Few Changes

No Ground For Thinking Bill Will Recede From Stand on Automotive Levies

WASHINGTON, July 16—It is believed that the treasury's program for tax revision will contain only a few minor changes due to the movement of economic forces since Secretary of the Treasury Mellon submitted his original recommendations to Congress last spring. There is no need for assuming that the treasury will recede from its previous declarations regarding the automobile industry. Just now the advisory board of the Treasury Department is comparing the fiscal needs of the government with the estimated yield from the proposed tariff schedule and proposed tax rates.

The House Committee on Ways and Means will undertake the study of tax revision about August 1, when it is expected that the tariff bill will be sent to the Senate. The Senate Finance Committee conducted hearings on the internal revenue legislation for several weeks last spring under an arrangement with the House Committee on Ways and Means, in order to expedite the passage of the revenue law. Because of this action, the Senate committee will be in a position to dispose of the House tax bill without long hearings and the whole measure should be enacted before September 15, provided Congress ceases bickering over various items.

While the treasury has made no public announcement of its plan, it is known that Secretary Mellon is dependent upon the advice of Prof. P. S. Adams, Chairman of the Tax Advisory Board of the Treasury. Prof. Adams is known to favor the replacement of the excess-profits tax by a tax on the undistributed profits of corporations. The Federal tax expert has always advocated simplification of tax laws, yet it is understood that the treasury plan will be more complex than the existing tax law.

I. H. C. LOWERS TITAN PRICES

Chicago, July 18—The International Harvester Co. has reduced prices on three of its tractor models, Titan 10-20 from \$1000 to \$900, International 8-16 \$1000 to \$900, and International 15-30 from \$1950 to \$1750. Each of these models is equipped with friction clutch pulley and angle lugs. The new prices are effective at once. In the case of the International models the price is the lowest ever quoted. With the equipment now included on the Titan the price too is lower than ever before. In announcing the new prices the company declares that all war time advances are wiped out and the products placed at a more favorable price than ever before.

Summary of Trade Shows Increase in Car Sales

Sales for July Better Than Manufacturers and Dealers Had Dared Hope

CHICAGO, July 18—Dispatches to MOTOR AGE from its correspondents in the principal distribution centers show that the volume of automobile sales at retail for the first half of July has been extraordinarily good as compared with the same period in June. While it is probable there will be the perennial mid-summer decline in the sales curve, it has been deferred later than usual in many cities. July business thus far has been better than either dealers or manufacturers dared hope it would be. Up to this time there has been practically no curtailment of factory operations and in some instances schedules have been increased.

Sales for the first half of July were better than the first fortnight of June in these cities: Detroit, Des Moines, Denver, Salt Lake City, Dallas, Cleveland, Columbus and Indianapolis.

July sales have held their own with June in Chicago, Milwaukee and Philadelphia.

July has shown a falling off as compared with June in New York, Minneapolis, New Orleans and Atlanta.

The Metropolitan slump is due to the universal exodus to summer resorts by persons able to buy cars. In the northwest interest is centered on the harvest. In the south the continued low price of cotton has exercised a depressing influence.

High June Sales in East Find Lower Level in July

New York, July 18—Passenger car sales which ran high throughout June in the metropolitan territory, have dropped considerably during July up to date, and the majority of dealers expect the falling off for the month to equal approximately that which prevailed in normal years before the war.

Oldsmobile, Scripps-Booth and one or two other cars which had price reductions late in June after the novelty of most of the competing reductions had worn off, sold better during the first two weeks in July than in previous months. However, the normal run of cars including the strongest sellers has showed considerable dropping off in day by day sales.

Some notable sales records were made during June. Dodge Brothers sold at retail within the limits of New York City more than 400 passenger cars and 100 trucks. It is said that this record has not been equaled except in cases where distributors included sales in outlying territories in their New York reports.

Nothing has developed to indicate that there will be any severe curtailment of buying during July and August. Dealers

generally expect business to be slow, but in this respect they will just be going back to normal conditions prevailing before the rush for cars in the past two years.

Hoosier Sales Satisfactory

Indianapolis, July 16—It is expected that retail prices for the first half of July will beat sales for the same period of June by from 10 to 20 per cent. Dealers say that sales are good for the time being. Those dealers handling cars on which reductions were made last month or during the last six weeks are reporting an exceptional business which will show a dollars and cents increase in spite of reductions.

Dealers in the higher priced cars say business is better so far this month

Withdrawals May Cancel Grand Prix at Le Mans

BY W. F. BRADLEY

(Special Cable to Motor Age)

PARIS, July 18—Darracq-Talbot, Sunbeam and Fiat have withdrawn from the Grand Prix scheduled for July 25 at Le Mans, because of dissatisfaction with the rules of the French automobile clubs limiting practice hours. These withdrawals, together with the general lack of interest on the part of the European industry in the race, make it quite probable that the race will be called off.

The Fiat company was the first to withdraw and its explanation at the time of the announcement was that with 30 entries promised and only 19 on record the lack of interest in the race was too evident to justify the great expense of the event. Many of the great automobile firms of Europe, interested in car development through racing, failed to enter in the first post-war Grand Prix. The Fiat company explains its position by saying that it is still interested in this great sporting event and that it hopes to take active part in all future races adequately supported by the entire industry.

than it has been during the year, and are rather confident concerning business during the remainder of the year. It is probable that Studebaker and Haynes cars are leading the field in their class, while the dealers in Dodge, Ford and Chevrolet all report increased sales during the month.

One reason for the increased sales, dealers say, is the fact that money is loosening up a little, though credits are yet very much restricted. Business in used cars also is showing a decided increase, and if the industrial situation continues to improve, it is probable that further increases in used car sales will be recorded.

Barometer of Trade Rises Steadily on Pacific Coast

California Sales Alone Expected to Continue Big Factor in Factory Production

SAN FRANCISCO, Calif., July 14.—The barometer of trade in all branches of the automotive industry is rising steadily in California; the southern part of the state is busier in these lines than the north, but the north shows steady gain, with every prospect of improvement. It is still a buyers' market, and the buyers are more carefully critical than ever, but more people are buying cars than have been buying them for the past 18 months. In other words, the market for the right car, at the right price, never was better in the territory for which San Francisco is the center of distribution.

DETROIT SALES INCREASE

Detroit, July 18—Steadily increasing averages mark daily sales of Detroit dealers in standard automobiles. Volume for the first 14 days of July indicate an average increase of 28 per cent for the month, over June. The largest percentage of increases was reported by Dodge Brothers, Overland, Buick, Oldsmobile, Studebaker and Hupmobile dealers, though practically everyone reports better business than in June.

Careful investigation of conditions by officials of the Detroit Automobile Dealers' Assn. shows distributors and dealers optimistic and confident that the increased demand is not a flash in the pan, but normal spring business delayed by unsettled price conditions and bad weather during April and May.

Price reductions naturally proved a stimulant to buying, and nothing is in sight now to indicate a slump in demand, according to Guy O. Simons, president of the dealers' association.

JULY SALES FALL IN SOUTH

Atlanta, July 18—The automobile business as a whole is less so far in July than in June for the same period. Companies reducing prices July 1 are experiencing a good increase, but there has been a considerable falling off in sales of these cars reduced June 1. Ford sales are reported exceptionally brisk. Recent reduction in discount rates of the Federal Reserve Bank of Atlanta does not appear to be having any effect on sales. Continued low price of cotton is seriously affecting all lines of business, and sales of automobiles to farmers as a result are far below normal.

BUICK-STUDEBAKER BOOM

Chicago, July 18—A statement issued by the Studebaker Sales Co., of Chicago, covering the first six months of 1921, shows an increase over last year of 124 per cent in cars sold and 104 per cent in money. For the month of June, 522 Buicks were sold and delivered in the city of Chicago, while the sales and deliveries for the Chicago territory were 1,552 cars.

Car Shipments for June Bitter Pill for Pessimists

Official Figures Show Automotive Industry Running on Firmer Basis Than Others

NEW YORK, July 16—Shipments of automobiles for the month of June, as reported by the National Automobile Chamber of Commerce were 8 per cent larger than for May and virtually the same as in April. They reached 60 per cent of the mark set in June 1920.

Carload shipments in June approximated 19,200; there were 18,000 driveaways and 3,700 machines were shipped by boat.

Figuring boat shipments and driveaways in carload equivalents, shipments for the second quarter of this year nearly doubled the first quarter and were 61 per cent of the second quarter of 1920. Shipments for the second quarter of last year, excluding Ford, were 311,505. Shipments for the same period this year were 190,018.

The figures since Jan. 1 by months compared with the same months of 1920 are:

	Carloads	
	1920	1921
January	25,057	6,485
February	25,505	9,986
March	29,326	16,287
April	17,147	20,187
May	21,977	18,608
June	22,516	*19,200
	Driveaways	
	1920	1921
January	29,283	3,185
February	43,719	7,507
March	57,273	9,939
April	64,634	14,197
May	74,286	15,193
June	60,746	*16,000
	Boat	
	1920	1921
January	—	93
February	—	99
March	—	75
April	—	1,619
May	—	2,381
June	8,350	*3,700

*Partly estimated.

These official figures demonstrate conclusively that the automotive industry is running on a better basis than almost any other in the field of manufacturers. It proves also that the pessimism which prevails in many quarters is not well founded.

Makers Closely Watching Dropping Prices of Steel

Cleveland, July 16—Cleveland automobile manufacturers as a rule say that it is too early yet to prophecy what results will follow the reductions in prices of steel recently made by the United States Steel Corporation.

Some of the producers say they have been buying at the new market price of steel for the past two or three months, and that the public announcements of price reductions are but confirmations of prices of which they have had the benefit.

It was developed that local manufac-

turers who convert steel into their machines have been buying closely, and have been playing for price reductions, while practically all have been asking for the benefit of price reductions on material delivered on contracts made be-

Something New Under the Sun

PHILADELPHIA, July 16—Motorists have complained that a new kind of girl, or at least a girl more in evidence than ever, has bobbed up. They call her the "motor vamp" and assert many of this type virtually hold business men up on the way to their office in their cars and smirk for rides to work.

fore the lowering of values. This is relied on to keep inventories down to near where they should be.

The Stearns Co. has made more motor cars this year than it did in the same period a year ago. The storeroom is empty today. That means that the company has found a ready market for its products. President George W. Becker says that June was an excellent month, with the factory running at capacity. He expects a satisfactory volume of business in the next six months. July started off satisfactorily with the factory operating at capacity.

The Winton plant is devoting more time to production, with results that are satisfactory. Production in June was the greatest in any month of the year, and July promises to be about as good as June. The company plans to manufacture more cars in the next six months than it did in the first half of the year.

Jordan produced 30 cars a day in June and the schedule for the present month is about the same.

At the Chandler and Peerless plants statements were made that factory operations were satisfactory and business was good.

DURLAND RETIRES FROM MITCHELL

New York, July 16—William L. Jacoby, an efficiency engineer and industrial expert for A. G. Becker & Co., for the past ten years, has been elected president of the Mitchell Motors Co., Inc., Racine, Wis. He succeeds D. C. Durland, who has returned to the General Electric Co. with headquarters in Chicago. Durland remains a director of the Mitchell company.

The retirement of Durland is understood to have been voluntary and the position he has taken with the General Electric is considerably more important than the one he relinquished to go with Mitchell Motors.

The Racine company is coming back rapidly and its sales for June were the heaviest for any month in nearly two years. Sales for the first ten days of July were ahead of the June record for that period. The outlook for the company is decidedly encouraging.

Buick Sales for June More Than 530 Cars Daily

Shipments for Month 3,800 Cars More Than for Entire First Quarter of Year

DETROIT, July 15—Buick Motor Co. delivered 13,759 cars into the hands of owners in June. Shipments last month were 3,800 more than those of the entire first quarter and represented actual retail sales at the rate of 530 cars daily compared with peak plant capacity of 600 cars a day.

E. T. Strong, general sales manager, said that Buick figures for June disprove the assertions that the automotive industry is through with big figures. "They are evidence that the industry has earned the right to the title of one of America's greatest industries," he said, "and that the spirit of pessimism prevalent in some quarters did not faithfully represent the sentiment of the public on whom the industry depends for success."

6,000,000 Animals to Ride to 1921 Market in Trucks

Chicago, July 16—High freight rates are forcing live stock producers to ship by truck, testified A. F. Stryker, secretary and traffic manager of the Omaha Live Stock Exchange, at the freight rate hearing on live stock before the Interstate Commerce Commission here.

"Twenty per cent of the hogs in one day's receipts at Omaha were delivered by truck," he declared. "One day 50 per cent of the sheep received at the St. Joseph market came by truck."

It was estimated that more than 5,000 head of cattle, hogs and sheep will be transported by motor truck direct from "farm to yards" during 1921, this being based on the 1920 figures from 17 stock yards in the corn belt. Counting in the smaller stock yards and the number of cattle delivered by truck to railroad sidings and from sidings to stock yards, it was estimated that 6,000,000 animals in all would be handled by truck during the year.

M. A. M. A. CREDIT MEET SEPT. 14

New York, July 16—This year's credit convention of the Motor and Accessory Manufacturers Assn. will be held at the Hotel Statler, Detroit, Sept. 14, 15 and 16. Tentative plans call for a comprehensive and vital program of papers and discussions, built around the central theme: "Bringing the Automotive Industry Back to Normal."

The annual credit convention of the M. A. M. A. is regarded as one of the industry's most significant gatherings, for there the credit managers, financial directors and general executives of the unit and equipment manufacturers exchange comments and experiences on current conditions and future prospects for the automotive field.

Texas Panhandle Country Largest User of Tractor

Necessity Proves Mother of Many New Uses for Machine Not So Popular Elsewhere

DALLAS, TEX., July 15—While there have always been recognized uses for the tractor, such as disk plowing, pulling disk harrows, breaking virgin prairies, pulling mowing machines, threshing, binding, cultivating, road grading and various other things the horse formerly did about the farm or ranch, it remained for the farmers of the Panhandle section of Texas to get the real worth out of the tractor.

In the Panhandle the farmers put the tractor to uses never thought of by the man who invented the machine or dreamed of by users in other sections of the country. These new uses of the tractor were developed because of necessity, the farmers and ranchers of the Panhandle say. They figured that while they fed the tractor only while it was working, if they fed it all the time it would work all the time.

In the Panhandle section of Texas today the manufacturer of the ordinary tractor can find his machine pulling up fence posts, stretching barbed wire fencing or hogproof fencing. He could find them operating the windmills when there is no breeze and water is needed, or running a syrup mill. He can find them moving houses along the road or dragging great amounts of grain to the elevators. Too, they will be found operating the elevator, and also the cotton gins.

Nor is that the end of the unusual things the tractor does in the Panhandle. In that section of the state they are made to operate the electric lighting apparatus for the farm after they have worked all day. They do the family washing when they are hooked up to a washing machine, or saw the wood for heating purposes. They are attached to cream separators and have been used in fighting fires. This week in a large Panhandle town where an afternoon paper is published a tractor was found putting the paper out. The power was down in

the city and the tractor was backed up in front of the pressroom, belts coupled to the press, and the paper got out on time.

So varied has become the use of the tractor by the farmers of the Panhandle that many have done away with the horse and mule altogether. They have a motto which says, "The tractor, the cow, the hen and the sow."

Implement men have not been slow to see the wonderful field for tractor business in the Panhandle. Practically every tractor concern in the country is represented in that section of the state, and they all report a big business. As the country develops in agricultural lines from year to year, more tractors are being sold. It is expected that 15,000,000 of the 22,000,000 acres of land formerly used as cattle ranges in this section will be in cultivation in 10 years and the greater part of the work will be done by the tractor.

Already it is said the tractor business in the Panhandle is better than any other place in the United States, and the tractor salesmen and manufacturers declare that the business is just in its infancy. Tractor business alone in the Panhandle this year will approximate \$25,000,000, it is said. Another year it is expected to double that amount.

REDUCE KLINE PRICES

Richmond, Ind., July 16—Prices on Kline open models have been reduced \$200 by the Kline Kar Corp., the new prices on the roadster and touring models being \$2090. The enclosed car prices are continued as formerly.

CORBITT TRUCK PRICES DOWN

Henderson, N. C., July 16—Corbitt Motor Truck Co. has reduced prices on all models from \$200 to \$500. Prices on the 1-ton are from \$2400 to \$2200; the 1½-ton, \$2800 to \$2600; the 2-ton, \$3500 to \$3150; the 2½-ton, \$3650 to \$3300; 3½-ton, \$4500 to \$4100, and 5-ton, \$5500 to \$5000.

Ottawa, Ont., July 16—The excessive hot weather that has been experienced here as elsewhere has made quite a few sales in used cars. Farmers finding their horses unable to carry on, have bought cars to bring their goods to market.

Uniform Motor Vehicle Law to Be Fathered in States

Preparatory Drafts of Measure to Be Perfected at October Traf- fic Officer Convention

OAKLAND, CALIF., June 16—Final adoption of a uniform motor vehicle law, which will be taken before every state legislature and every lawmaking body in Canada as well, will be the main object of business when the International Assn. of Traffic Officers meets in annual convention in Oakland in October. Preparatory drafts of this uniform law were made at the last convention in Cleveland, and the executive committee of the association is expected to complete the details and finally adopt the measure at the 1921 meeting here. Approximately 2,000 delegates are expected at this year's convention, including not only traffic officers, but experts on traffic and on vehicular travel from all parts of the United States and Canada.

J. H. Nedderman, in charge of the traffic squad of the Oakland police department, and secretary of the association, and C. D. DeMar, local traffic expert and chairman of the ways and means committee of the association, are working on arrangements for the entertainment and housing of the convention in October.

Chevrolet Makes Second Reduction in Its Prices

Detroit, July 18—Another reduction in prices on all models in both its lines has been made by the Chevrolet Motor Co., effective July 15. In the "FB" line the touring car and roadster have been cut from \$1,185 to \$975 and the coupe and sedan from \$1,885 to \$1,575. On the "4-90" models, the touring car has been reduced from \$645 to \$625, the roadster from \$635 to \$625, the sedan from \$1,195 to \$975 and the coupe from \$1,155 to \$975. The prices are f.o.b. factory. This is the second of the General Motors Corp. subsidiaries to make a second price reduction since the readjustments began. The Oakland led the way.

THE WHY AND HOW OF THE INTAKE MANIFOLD

INSTALLING a new intake manifold of a different shape, size or length than the original one will often improve the performance and economy of an old engine. The reasons for this as well as the illustrations of the many different forms of manifolds will appear in MOTOR AGE in a short series of articles beginning with the August 4 issue.

Why the latter day fuels become pocketed and condense in some forms of manifolds and not in others will be clearly explained, as will also the reasons for shortening some manifolds and constricting the area of other types.

There are hundreds of service station owners who are

being blamed for the poor showing of the older engines, which are well made in all respects except in that of the manifolds. These important members may have been and probably were efficient at the time the engines were built.

But, times and gasoline change and, in the case of the latter, usually for the worse. Therefore, a manifold which was all right five or six years ago may be far from efficient today. A study of the simply written series will clear up many points, heretofore but hazily understood, and better qualify the service man to advise his customer whether or not the installation of a new manifold will better car performance and economy.

Western Centers Show July Increase Compared to June

Business Pick-up Especially Marked in Des Moines Territory—Dallas Sales Good

DES MOINES, July 18—Interviews with 10 leading Des Moines dealers show that stimulation of business has held up well during the first half of the month; in fact, improvement of approximately 20 per cent over June is noted by all dealers. This refers only to retail city sales as country business with the exception of Dodge, Overland and Ford is practically at a standstill. Final figures for June showed 10 per cent improvement over May.

Eight of 10 dealers interviewed forecast continuance of present business until late September or early October. The other two expect a let-down by late August. Truck sales are at a minimum.

Dallas Sales Up 15 Per Cent

The used car business is brisk at readjustment prices. Money is somewhat easier in the city and collections are fair but there are no signs of improvement in credit conditions in the country. July sales in the city are practically on a par with July, 1920. The major part of the improvement over conditions of spring and early summer is attributed to the stimulation of price reductions.

Dallas, July 18—Canvass of 15 retail automobile concerns in Dallas revealed that sales during the first 10 days of this month showed an increase of from 10 to 15 per cent over sales for the same period in June. Dealers declare this is due to the fact that the market of grain crops is pouring some \$30,000,000 into the pockets of the grain growers and as this money finds its way into other channels, financial stringency is loosened up and cars are bought.

The same retail houses declare prospects now are better than they have been for many months and say they expect to do a banner business during July and August. Another cause of increased sales is said to be the touring season. Reduced prices were a decided factor in increased buying.

In addition to retailers reporting increased sales for the first 10 days of July the used-car dealers declare they have never had better business. Retailers claim they are having more inquiries for cars right now than they had for a year, and that generally these inquiries lead to sales.

Accessory and tire men also reported improved business during the early part of July. It is learned from wholesalers here that the automobile business over the territory generally is improving and that sales have increased during July.

Intermountain Trade Improves

Salt Lake City, July 18—Retail automobile business in the larger cities and towns in the intermountain territory has shown a steady improvement during the

first half of July. Salt Lake, Ogden and Provo, Utah, and Boise, Ida., dealers, are showing a better working spirit than is manifested by the less highly organized dealers in the smaller town and communities. Wholesale business is at a standstill and dealers are largely dependent on their retail efforts to equilibrate their sales.

The retail business is holding up well under the general business slump, largely because sales managers and salesmen are overlooking no opportunities. Salt Lake distributors particularly are diligent in pursuing prospects. Tourist trade during the last six weeks has aided the industry materially and the repair business is by this reason considerably better than during the spring.

Price reductions coming on the first of July have also helped to stimulate sales. Tires, accessories and batteries are registering a lively trade.

P. F. Drury, assistant general manager of the National Automobile Dealers Assn., is visiting in Salt Lake. At an address before the Intermountain Automotive Trades Assn. he stressed cooperative methods and association work. From here he will go to Boise then to Portland, Tacoma, Seattle and he will be in Spokane the 27, 28 and 29 of this month to attend the annual meeting of the Washington Automobile Chamber of Commerce.

Denver Trade Steady

Denver, July 18—Automobile sales seem to average slightly better than for the first half of June with less restlessness about further price drops, though some dealers report slower business. One dealer has sold six cars in July against 18 for the first half of June, but he had a rush then because the June 1 price drop attracted waiting buyers. He is now short of certain models demanded and also says July always was a slow month.

Another dealer reports 12 cars sold in July at retail against only three in June for the same period. This dealer believes that price restlessness largely has been overcome, and another distributor expects his July total to exceed June sales of 44 at retail and wholesale.

Exact registration comparison is impossible because no July licenses are yet entered on the state records, but leading dealers lean toward at least a slight gain in sales.

June and July Neck and Neck

Philadelphia, July 18—Retail automobile sales for July thus far compare very favorably with June sales. Prospects are for considerably improved trade. Sales of new cars are 45 per cent of the entire June sales. This is considered owing largely to reduction of prices which is now considered over.

Another good sign is the falling off in sales of used cars which were good earlier in the season but now are quite flat. In new cars, high priced automobiles are beginning to sell as well if not better than the less expensive types.

Plan Central Market for San Francisco Used Cars

Space to Be Assigned Dealers After Same Plan Used at Automobile Shows

SAN FRANCISCO, CALIF., July 16—A new solution for the used-car problem, offered by W. A. Knuckey, manager of the Butler-Veitch Co., is under serious consideration by the San Francisco Motor Car Dealers' Assn. Knuckey proposes the establishment of a central used-car and used-truck market, to be operated cooperatively by the automobile and truck dealers of San Francisco.

The proponent of the plan has shown his confidence in it by leasing at his own expense a 275x550-ft. lot known as "Central Park" and equipping it with inclined driveway, fence and electric lights so that it is ready for both day and night service and so that the association may experiment with his plan without the cost of preparing the market place.

All those cooperating in the experiment, or in the later establishment of a larger market, are to be assigned regular space for display, in much the same manner as at an automobile show. Careful appraisal of all cars offered shall be made by an independent committee of competent dealers.

House Resolution Prohibits Reimportation of Trucks

Washington, July 15—Congressman Graham, of Illinois, formerly chairman of the select committee of the House to investigate expenditures in the War Department, has introduced a joint resolution which specifically prohibits the reimportation of surplus war supplies except at a duty of 300 per cent, which is in effect an embargo. In a statement to *MOTOR AGE* today, Graham said that the resolution covered all supplies sold abroad by the government and was drafted in order to expedite legislative action. He expects its passage in the Senate and House before the tariff bill has completed the circuit.

The permanent tariff bill as reported out by Ways and Means committee July 1 contained no specific reference to reimportations of trucks as had been anticipated in some quarters. It is possible that this situation may be remedied on the floor of the House during the tariff debate, when the bill is subject to amendments. Congressman Graham stated that he was convinced that his resolution would prove more effective. Assurances have been given that the Ways and Means Committee will approve of it as a special measure looking forward to the protection of domestic markets.

The joint resolution fixes a duty of 300 per cent ad valorem on all goods, wares, merchandise, military and naval supplies when reimported.

Canada's Only National Motor Show Opens Aug. 27

Will Be Held in Conjunction With
National Exhibition at
Toronto

TORONTO, July 17—Canada's only national motor show will be opened in conjunction with the Canadian National Exhibition, Exhibition City, Toronto, by General Sir Julian Byng, August 27—the first official appearance of Canada's newly appointed Governor-General.

Space has never been so heavily oversubscribed, yet applications continue to pour in. As was done last year, the Transportation building will be devoted exclusively to passenger cars. Following the example of the Automotive Industries of Canada (the N. A. C. C. of the Dominion) the Canadian Auxiliary of the Automotive Equipment Ass'n. has recognized the event as Canada's only national motor show and is giving it its active support. As a result of its efforts both demobilization armories have been given over to accessory and equipment displays and many manufacturers who have not exhibited heretofore have been induced to take space.

The truck displays will be under "big top" canvas to the west of the Transportation building and south of the armories.

Motorcycles and motor boats will be shown before the grandstand (seating capacity 20,000), while tractors will be under canvas with short demonstrating grounds. Aeroplanes will also be featured in the exhibit.

It is estimated that approximately 800,000 people attended the National Motor Show here last year.

Complete Arena Next Year

Next year with the completion of the huge arena under construction, the commodious Horticultural building with its imposing dome will be rechristened the Truck and Automotive Equipment building, and will afford excellent accommodation for the display of these branches of the industry.

August 27 and 29 will see the opening of the dirt track racing circuit with the meet on the "Ex" half mile oval. Approximately a score of drivers have applied for entry blanks. Last year some 40,000 admissions were paid to this event.

Some conception of the importance of the Canadian National Exhibition as a touring objective may be gleaned from the fact that one afternoon last year 13,000 cars bearing licenses of practically every state in the Union and province in the Dominion, were parked within and around Exhibition City.

Business throughout the provinces of Ontario and Quebec is reported from fair to good. Throughout the western and maritime provinces conditions are

less favorable, though fine crops have served to improve it.

Sales of cars continue "spotty" and though several distributors report good business, the annual midsummer slowing-up is in evidence. However, some of the largest distributors report more cars sold since the first of the year than were sold throughout the whole of the peak year 1920. On the whole the industry and trade admit business has been much better than was anticipated.

200 Japs Joy Ride In One Car

PONTIAC, Mich., July 16—Two hundred Japanese are riding in Oakland touring cars which they call their own, through a co-operative idea established by a Japanese company. The firm was organized with an initial capital of \$150,000 and the first purchase was 55 touring cars. These have been sold to 11,000 Japanese under the plan by which the company operates.

Each stockholder pays ten dollars and in return receives a one year's interest in a touring car. The year has been divided into days and hours and a specific time allotted for each stockholder to take a ride. For instance, a man is notified that his time will be say every Thursday from eleven o'clock to three. The arrangement nets the firm \$2,000 for each car sold and gives the Jap automobile enthusiast the satisfaction of being a car owner for the very modest investment of \$10.

FINDS RATES UNREASONABLE

Washington, July 16—The Interstate Commission has rendered a decision of unreasonableness making award of reparation in the complaint of the Chevrolet Motor Co. of California against the A., T. & S. F., et al., for rates on automobile floor, toe, and running boards, from Detroit to Melrose, Calif., within the switching district of Oakland. The order requires the establishment of reasonable rates not later than Sept. 1. The commission found the fourth class rate, governed by Western classification, and the class A rate governed by the consolidated, on shipments prior to and after Dec. 30, 1919, unreasonable, and followed this with other findings of unreasonableness. The net effect of the decision is that the carriers' charges were one class too high.

OTTAWA SHOW SEPT. 9, 17

Ottawa, Ont., July 16—The Ottawa Motor Show, to be held in connection with the Central Canada Exhibition from Sept. 9 to 17, promises to exceed past years both in size and interest. Local dealers are a unit in boosting the show. Officials state the greatest trouble will be to house all displays offered. The permanent show building, Howick Hall will be used for cars and the annex devoted to truck and accessory display.

Dealers Association in Peoria Producing Results

Fees Are Raised to \$75 a Year
With All Service Men
Admitted

PEORIA, Ill., July 15—One of the most virile automotive trade associations in the west is that at Peoria, Ill. With an approximate membership of 50, there is always a two-thirds representation at the periodical meetings. Even during the period of business depression the association kept up its activity and has always displayed an optimistic front. Dues have been unnecessary in the past, the profits from the annual shows being adequate to take care of the running expenses, donations to good roads and other causes. In the future, there will be an annual membership fee of \$75.

A new feature proposed is the compilation of a list of all salesmen, mechanics and other employes at each garage and sales agency. It has been suggested that no firm employ anyone previously associated with some other plant, without first consulting the secretary. The latter, under the new arrangement, will have in his possession the record of each employee. There may be some reason why the employee left his employer, which is important to the other firms.

To Increase Membership

It is desired to give both employers and employees a square deal. The Peoria association loyally supports both the state and national associations of dealers. To keep up interest in addition to periodical meetings, occasional picnics are arranged enabling the dealers, their families and employees to get together for an enjoyable outing.

Recently, it was voted to increase the membership by permitting every repair-shop in the city to become affiliated. Even the so-called "alley" shops were given the opportunity to join the association, more for their own good, perhaps, than that of the older and more established firms. Should the experiment of admitting the struggling shops prove a failure, they will be dropped. It is believed, however, that the addition of the small concerns will be beneficial to all, giving the newcomers, especially, a better insight into the approved methods of doing business, increasing their profits and enabling them to guard against losses through the advice and suggestions of the more experienced proprietors.

ROAMER PRICES LOWER

Kalamazoo, July 16—Effective July 2, the Barley Motor Car Co. has reduced the price of the Roamer car. The reductions range from \$265 to \$650 on the various models. The 4-passenger standard touring which was priced at \$3250 is now \$2985.

Concerning Men You Know

Charles B. Shanks, for more than six years manager of Motor World, has become associated with the Anderson Motor Co. of Rock Hill, S. C., manufacturers of the Anderson six. He will appear on the official roster as vice president of the corporation and will give principal attention to sales, advertising and service. Prior to Mr. Shanks' connection with the Class Journal Co. he was for ten years sales and advertising manager of the Winton Motor Car Co. of Cleveland.

Charles Hendy, Jr., with the Ford organization for 14 years, first as manager in Denver and recently manager of the Chicago Ford plant, has joined the forces of the Simplex Corp., Chicago.

Robert B. Black, who was formerly assistant sales manager of the Black & Decker Mfg. Co. of Towson Heights, Baltimore, has been appointed manager of the company's Philadelphia branch. Black succeeds W. C. Allen, who has been made a special factory representative with headquarters at the company's Cleveland branch.

Donald P. Hess has become general manager of the Columbus plant of The Timken Roller Bearing Company, succeeding C. N. Replogle, who has resigned.

A. G. H. Jenssen and George Bender have been re-elected president and vice-president of the Toledo Automotive Trades Assn.

N. A. D. A. Appeals to Dealers For Pueblo Flood Relief

Chicago, July 18—What if it had happened in your town?

With these simple words in its appeal to the automobile dealers and automotive associations throughout the United States, for aid to the Pueblo flood sufferers, the National Automobile Dealers' Assn. draws a vivid picture; one that has instant appeal and intense human interest for any one who reads and repeats the question.

The loss to those engaged in the automotive industry in Pueblo totals \$237,000 in actual investment, not to mention the loss of new business. Dealers with well established lines are being taken care of generally but the smaller merchants are having a strenuous time of it owing to their investments' being entirely wiped out.

It has been suggested that if all the regular organized associations will, as associations, donate from \$50 to \$200, a sufficient sum of money will be made available for those whose need is most urgent and will enable them to again take their place in the industry.

The N. A. D. A. is starting the subscription list with \$100.00 and will attend to the details of having a proper committee of well known dealers appointed who will attend to the distribution of the money, and who will make a report of their trusteeship, advising what has been subscribed and how it was expended.

Bring this to the attention of your board of directors and forward your check to the Pueblo Flood Relief Fund, care of N. A. D. A. Headquarters, 320 North Grand Avenue, St. Louis. Individual subscriptions will be acceptable as well as association donations. No amount is too small. If everyone will just help out a little, in the aggregate it will be a big help.

Just consider—HAD IT HAPPENED IN YOUR CITY.

DEALERS, MAKERS CLOSER

Buffalo, July 15—The July meeting of the directors of the National Automobile Chamber of Commerce is being held here today. Ever since Colonel C. C. Clifton, of the Pierce-Arrow Motor Car Co., became president of the chamber, it has

been the custom to hold one meeting a year here at which he is the host for his fellow directors. The third of the series of meetings between committees representing the N. A. C. C. and the National Automobile Dealers Assn. was held here yesterday. Further progress was made in the direction of ironing out differences of opinion which have arisen between the two branches of the industry.

G. M. C. Sues Ver Linden to Recover \$490,000 on Check

Detroit, July 15—Suit has been filed here by the General Motors Corp. against Edward Ver Linden, former president of Olds Motor Works, to recover \$490,000 alleged loan to himself by Ver Linden from Oldsmobile funds on deposit in Lansing without the knowledge or consent of General Motor officials. The refusal of Ver Linden to return the money upon demand of General Motors officials when the loan was discovered resulted in Ver Linden's immediate dismissal, according to the petition filed in court.

Ver Linden said that he had heard of the court action but had nothing to say in regard to it. He refused to affirm or deny the charges in the petition and would say nothing regarding the loan.

The petition says that Ver Linden was employed as general manager of the Oldsmobile division under the usual written manager's contract providing for a salary plus a bonus on net earnings of the Oldsmobile division. The annual bonus was payable in parent corporation stock and held for a period of years in custody of the corporation in accordance with a written uniform plan. It is alleged that Ver Linden disputed deductions for depreciation in inventories of the plant made by corporation accountants in order to reduce them to market value and also demanded, the petition says, that the bonus shares of stock being held for him be delivered to him immediately. Although under the corporation plan dividends during the period of retention of stock are paid to managers and employees whenever declared to other stockholders, writs of garnishment against any and all funds to the credit of Ver Linden in any Lansing bank were issued by attorneys for the corporation.

The suit resulted from an action by Ver Linden as assistant treasurer in countersigning a check April 20. The check was drawn by the Olds Motor Works division and made payable to him against funds of the company in a Lansing bank.

Tractor Demonstration Results Lack Vital Figures

Concluded from page 23

hay and oats needed by each horse outfit and the number of man-hours for plowing and for seeding.

The horse outfits required 2.64 man-hours per acre, which at 40 cents per hour gives \$1.056 man-cost per acre, as compared with 33.6 cents by the best six tractors.

The cost of preparing the soil for sowing and seeding, as based on a man-hour record and labor at 40 cents per hour, shows that the cost per man-hour for the six best tractors is 12.80 cents as compared with 57.20 cents by horse. Each horse outfit consisted of six horses. The tabulation for the different classification is:

	—Per acre—	
	Man-hrs.	Cost
No. 1—Gen'l avg. (kerosene)	418c	16.72c
No. 1—Gen'l avg. (gasoline)	43c	17.20c
No. 2—Best half average	42c	16.80c
No. 3—Best six average	32c	12.80c
Horse outfit average	143c	57.20c

TRACTOR SHOW JAN. 30-FEB. 4

Chicago, July 16.—Definite decision to hold a tractor show in Minneapolis, Jan. 30 to Feb. 4, inclusive, and to hold a show week in Kansas City during the winter, has been made by the national demonstration and show committee of the National Implement and Vehicle Assn. The Kansas City event will not be held in any central building, but each manufacturer will convert his Kansas City headquarters into a display room with general cooperation in publicity and other features to attract visitors.

Grand Central Palace to Hold Gotham Show in 1922

New York, July 18—The 1922 New York automobile show will be held, in all probability, in the Grand Central Palace instead of in Madison Square Garden, as originally proposed. Negotiations to this end have been practically completed, although a few details remain to be cleared up.

This arrangement, which will be eminently satisfactory to everyone concerned, is made possible by the fact that plans for converting the Palace into an office have been delayed. The Garden still is available in case of emergency, but its use would involve very heavy expense because of alterations which would be necessary in the building. The rental charged for the Palace will be much higher than in the past, but the N. A. C. C. has decided that nothing must be permitted to interfere with the success of the show next year.

Automotive Architecture

Planning & Building Problems

Conducted by Tom Wilder

A \$150,000 Corner for a Filling Station

THE photograph reproduced on this page shows the recently completed filling station of the Magnolia Petroleum Co. at Dallas, Tex. This is said to be the largest in-and-out station yet constructed. Its location is strategic. The cost of the location indicates that. It is available from three streets, and these streets happen to be the principal thoroughfares of Dallas. Thousands of cars pass this corner every day, and hundreds of these cars buy gasoline at the Magnolia station.

From the photograph you will see that the building is two stories high. Offices of the north Texas division are on the second floor. These offices accommodate the manager, assistant manager, and the accounting force. If it had not been for the possibility of utilizing this location for offices as well as for a filling station, it probably would not have been considered wise to make the purchase, but as it is, the investment has been well placed.



Filling station built on a down-town flatiron

Cars Easily Pass Each Other

You will see from the picture that there are four compartments in which cars may be filled. Each compartment is wide enough so that cars easily pass each other, or may stand side by side in each driveway while being filled. The first two driveways at the end each accommodate two cars at a time. The other two compartments accommodate four to six cars at a time.

In taking advantage of this valuable corner, it is realized that attractiveness and neatness would count for a lot in getting the business, so the best of architectural skill was employed in planning the building.

The success of the plan is clearly shown in the picture. Light yellow brick and terra cotta for decorations are the materials used. This filling station has become one of the "sights" of Dallas, and visitors almost invariably tell about it after they get home. In speaking of the station, they, of course, mention the Magnolia Petroleum Co., and this helps advertise "Magnolene," the company's brand. So you see there is an advertising value that extends to an almost unlimited territory.

From the picture you will get the impression that this station is usually pretty well filled. It is in fact now considered one of the most effective publicity expenditures yet made by the company.

Enlarging a Small Store

PLAN 354

We are submitting a sketch of a store building occupied by us temporarily.

The departments to be operated are: sales of autos and accessories—with show-room for one or two cars, if possible; storage for cars, to accommodate as many as convenient in a building of its size; repair shop, suitable for about three cars, preferably to rear or alley side of building, with entrance from rear only, if advisable. Serve-U Motor Sales Co., Milwaukee, Wis.

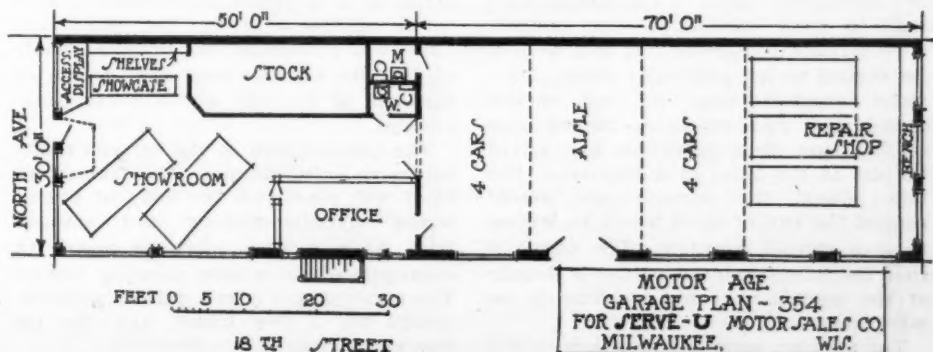
In adding to an old building one is always handicapped. Here, if a few feet could be taken from the front part and added to the garage, the garage and shop could be made a little wider and less cramped.

Under the circumstances it might be best to eliminate the idea of a partition between the garage and shop; then,

when the garage is not full the space can be made use of by the shop.

If possible, we would move one of the posts in front as indicated in order to gain space and also to get a larger show window for cars. Possibly if the office and stock room are larger than you desire the stock room space may be divided and the front half used for office, leaving space for two more cars, either new or used, in the show room; this also would simplify the handling of accessories by the office force.

We would advise enlarging the show windows facing Eighteenth street so that one coming toward your corner from the east would see the cars for a considerable distance. As an advertisement these windows would be a very good investment.



The front 50 feet of this building is old, the rear 70 ft. is to be new

Better Business

Money-making Ideas

Check Up Sales Against Inquiries

What percentage of sales do you make to people who are enough interested to come to your establishment? Unless your percentage of sales to prospects who call at your place of business is ninety-nine or a hundred per cent, your salesmanship is pretty poor. And if it is poor you ought to be about the task of improving it at once. Check up on this and see where you stand. In the last analysis the sales end of a dealer's business is the most important end of his business. It would be well worth your time and attention to check up on it carefully and to improve it when your check shows that improvements are needed.

Time Payment Plans Attract Customers

"Save your shoe leather," is the way a recent advertisement of the E. W. Steinhart Co., of Indianapolis, with branches in several Indiana cities, is headed. The ad was for rebuilt Dodge

A dollar will be paid for all ideas accepted as Better Business — Perhaps you have some

cars and went on to read as follows: "Dodge cars at prices that in many instances are little more than the cost of rebuilding. Our loss is your gain. At these prices, riding is cheaper than walking."

After this statement the ad told about the time payment plans by which the cars could be purchased. For instance, this is the way the time payment plan on one of the cars was put:

"Car No. 747—Dodge Touring.

"\$241.00 down,

"\$8.17 weekly, sixty weeks.

"or you can pay

"\$289.20 down

"\$42.65 monthly, twelve months."

There is a hint for other dealers in this plan of telling in an advertisement all about the payment plan.

Advertising With Class Interest

One of the best possible recommendations for a car is the fact that many men of varied means and of different walks in life purchase the car. This always argues that the car must render exceptional service. Therefore it would be a good plan for the dealer to advertise that he is handling a car that is universally recognized as delivering exceptional service and to then back up this statement by listing men in different classes who have bought the car from him. This list should include representatives from the following classes:

Bankers, merchants, machinists, lawyers, insurance men, realtors, women, etc.

When the owners were listed this way, the line-up would be very impressive and would bring inquiries and business to the dealer.

A "Circus" With a Used Car

When the circus comes to town the used car dealer might link his business up with the event by means of an advertisement or banner reading like this:

"You can have a 'circus' with one of our used cars.

"By a 'circus' we mean a corking good time.

"By our payment plan it is easy to buy a used car from us at it is to watch a circus parade or get a seat in the big tent.

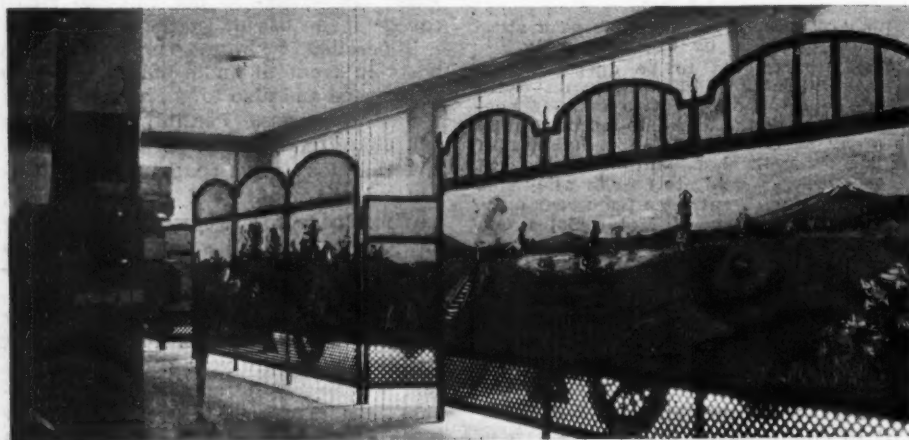
"Talk your own private 'circus' over with us NOW."

This sort of an advertisement would be sure to secure a lot more attention at circus time than any ordinary advertisement which did not mention the circus.

Price Drop Appeal Good

An interesting and business-building way for the accessory dealer to show how the price of accessories has dropped would be to make up a window display showing what \$25 spent for accessories at his store would buy last year and what it will buy now. At the left of the window should be one or two articles which \$25 would buy last year. At the right should be the same articles and the additional accessories which the \$25 will buy now. Appropriate cards should call attention to the display and tell just what it means. Undoubtedly, such a display would attract much attention from the motorists and help business.

Artistic Screens Emphasize Car Models



THE proprietor of a prosperous branch automobile house in the middle west, uses to good advantage the artistic screens shown herewith. It may be that he wishes to lay particular stress for a short length of time on one special model, and with fifteen or twenty cars on the floor, these particular cars might be lost in the maze of automobiles. For this reason the screens are placed around the two or three which he wishes to give special attention. The result is that he brings out the points of beauty of the models as could be done in no other way.

The screens, each tinted and depicting

a rugged western scene, mountains and streams, or a placid countryside, lend a fitting environment for the cars. The effect was gratifying, as the owner decided that the screens were responsible for the sale of at least a half dozen automobiles.

The construction of the screens themselves is quite simple. The framework is of soft pine with the body of beaver board. Artistic shaping and suitable trim, when painted, give the scenes an appropriate and wholly pleasing aspect. The services of a scenic painter were required for a few hours, and the job was completed.

Keep in Touch with Financing Concerns

It always pays to keep in the good graces of the local financing companies. Frequently automobile prospects go to the financing companies to see if the companies will carry them, before they go to the dealers to buy cars. Consequently the financing companies are in touch with many prospects whom they can send to those dealers whom they favor.

Also the financing companies are in touch with people who are completing long terms of payment and who are thinking of purchasing new cars and they can also send these folks to the dealers they favor. Consequently, it would be the best sort of business for the dealer to cultivate the friendship of the local financing companies and to make a point of calling on them at least once a week in the search for prospects.

Speedometers Are Builders of System

Business men would not run their businesses without an accounting system, yet many of them operate cars and trucks that are not equipped with speedometers. Have you ever shown these men that speedometers are the accountants for their trucks and cars? How can they keep an accurate record of operating costs, of gasoline consumption, of tire mileage and of the general efficiency of their truck system if their fleets are not speedometer equipped? Business is built around sound accounting systems. Show the business man that the speedometer is the auditor of his truck or car and you will have more speedometer sales.

Driver's License With First Car

A Wolverine car distributor has gone a step farther in the matter of service. In his advertisement he guarantees a driver's license to any customer buying his first car. Five or six lessons in driving are usually sufficient and give excellent opportunity for the car salesman to become personally acquainted with the customer, to give him proper instruction in operating the new car, etc.

Occasionally prospective buyers are also given demonstration on these drives of instruction. The man who has just purchased and is learning to drive is generally so enthusiastic that it becomes contagious and helps the next sale.

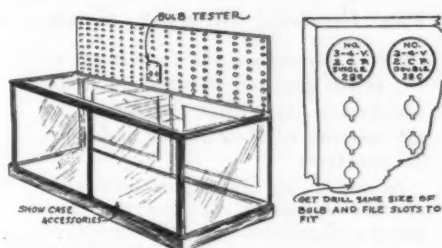
After sufficient instruction the salesman indorses the customer's application for a license, testifies before the Chief of Police as to his proficiency and the new customer has been made a firm friend of the distributing company.

Cooperative Publicity Successful

When Vetter Bros. opened their handsome new garage on Broadway in Fort Wayne, Ind., they secured a tremendous

amount of publicity for the building by securing the cooperation of all the contractors who had done any work on the structure, in putting over a two-page advertisement in the local newspapers.

Each contractor used a small amount of space to tell about the work he had done on the garage, thus making a lot of advertising for Vetter Bros. without their having to pay for all of it. Here is the way some of the advertisements read: "All glass in the new Vetter Bros. garage furnished and installed by Fred H. Breimeyer;" "All plumbing and heating in the new Vetter Bros. garage, including steam heating plant and sanitary equipment installed by W. C. Horstmeier," etc.



Attractive bulb display helps sales and saves time

Making Lamp Bulbs Sell Themselves

An extremely satisfactory way of displaying bulbs and giving the customer quick service is that in use by The Enterprize of San Antonio. Fitted to the back of an eight foot show case for accessories is a board in which holes have been drilled and slots filed to fit the bulbs. The bulbs are arranged in rows of ten with a round metal bound ticket at the top designating size and voltage with the price. As these are displayed in the front of the store and are readily available, they practically sell themselves.

Sold Magneto Brushes for Electric Fans

Many service stations carrying a good stock of brushes for magnetos have found them slow sellers since many cars are using battery ignition. One southern Iowa dealer who had a large stock of such brushes was at a loss to know how to dispose of them until a customer brought in an electric fan which needed new brushes. He fitted this up with two of the brushes, and then by making a trip around the square and by running a small advertisement in a local paper sold out his stock and got a nice bunch of profitable fan work.

Free Distilled Water Increases Fuel Sales

As a general thing a filling station does not have to do any great amount of promotion work in order to get business. But every now and then competition becomes strong and it is necessary for the owner of the station to do something extra in order to make people buy gasoline from him.

One Indiana filling station solved this problem by giving away distilled water free to all motorists who desired it for the batteries of their cars. The fact that the water was being given away was played up strongly by the station, and many motorists took advantage of the offer, with the result that the station secured a largely increased business.

Its Hill Climbing Ability as Sales Asset

"Show me a hill I can't climb" is the suggestive slogan lettered on a tire carrier cover of a demonstrator in Connecticut. Needless to say passersby take a second look at the slogan.

\$10 Cash for a Name

"Ten dollars for the name of a prospective purchaser" is the offer being made by the Elgin Motor Car Sales Co. of Chicago. A form letter, enclosing a card illustrated herewith, is being mailed to all Elgin Six owners urging them to boost the Elgin Six and to send in the name of possible purchasers. The conditions on which the payment of the ten dollars hinges are: that the prospect's name is not already on the file of the sales company; that he buys a car within ninety days from the date of receipt of his name, and that he buys it from the Chicago sales office.

PROSPECT CARD

Date.....192.....

Name

Res. Add.....Phone.....

Bus. Add.....Phone.....

Now Owns.....Interested in.....

Signed

Address

Phone

Remarks

The Readers' Clearing House

Questions & Answers

Easily Made Armature Testing "Growler"

Q—Publish the directions for making an armature testing "growler" which appeared some time ago.

2—State size and weight of wire to use.

3—Can we make same for a 6-volt battery and use a voltmeter?

4—If not, where can we get a meter for 100 volts to use with growler?—M. King, Kimberly, Ida.

1—See Fig. 1.

2—Three and one-half pounds of No. 22 copper wire will be about right for the winding. This will give a direct current resistance of 28.9 ohms, and when connected on a 110-volt line the current consumed will be less than $3\frac{1}{2}$ amp.

Many transformers are built up of alternately laid core sections. This is an old method of making the core, is very slow and is quite expensive. An easier way to make the core is shown in Fig. 1. With this construction two different sections are used in the core. These sections should be built up, and bolted together to compress the laminated pieces and hold them close together. The ends of the pieces can be filed to resemble the edge of a saw. This profile section can be fitted and held together by the clamping arrangement shown.

There will be very little magnetic loss due to the sawtooth connection. The winding should be made with the hole for the core large enough to allow the iron core and the side strip on each side of the core to fit through the winding. The side strips should fit along the side of the core for the winding and should project through the end of the core just enough to allow the compression strip to fit into the square hole in the end of the side strip. The cap screws when tightened will hold the side pieces and the core closely together.

3—It is impracticable to use a battery

CONDUCTED BY WM. H. HUNT

Technical Editor, Motor Age

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

for this work as it would be necessary to devise some sort of a current reversing switch which would operate at high speed. The voltage of the battery would not be sufficient to overcome the reactance of the armature winding.

4—Reliance Instrument Co., or the Jewel Manufacturing Co., both of Chicago. An alternating current meter calibrated up to about 15 amp. will be needed.

FORD VIBRATOR POINTS

Q—We have been using the K. W. Sparkite Coil points made by the K. W. Ignition Co., for over a year and find them a long life point, but we have ignition trouble once in a while. We had a talk with a Ford mechanic who said the trouble was with the Sparkite points. He said that the coil should not spark so as to be noticeable at the points. What is your advice on this subject? Give us

what advice you can on Ford coils and the best points to use.—Payne & Welch Garage, Surprise, Nebr.

The K. W. Ignition Co.'s products have a very good service record, which seems to be borne out by your experience. It is not at all surprising that you should have ignition at intervals. This is one of the things that comes to all of us. Sparking does not necessarily argue poor quality in the points. It may be caused by an exceptionally good magneto, too stiff an adjustment of the vibrator springs, or too wide gap in the spark plugs.

However, excessive sparking is abnormal and should be remedied as it rapidly burns away the points. The best way to adjust the vibrator is with the aid of the hand-operated magneto assembly to be found in many Ford Service stations and which is sold by several concerns. If one of these is not available the next best thing is to adjust the coils so that they deliver a good spark at the plugs with a minimum spring tension and sparking at the points. Besides the K. W. point any good quality tungsten steel point should give satisfactory service.

REWIRING PLAN FOR OLD CARS

Q—One of our patrons has just purchased an old Mercedes chassis and I wish to install a modern light system. This car is now equipped with a Westinghouse generator, 6-volt battery and an ammeter. In addition to this, I would like to install double bulb headlights, tail-light, dashlight, trouble-light and horn. I would like to connect the dashlight up in such a way that it would be an indication as to whether or not the tail-light was burning, which I believe is the up-to-date method. I enclose herewith a sketch showing my idea of this wiring circuit. Is this all right, or is there something better? Could you also advise me who makes the modern attachments for

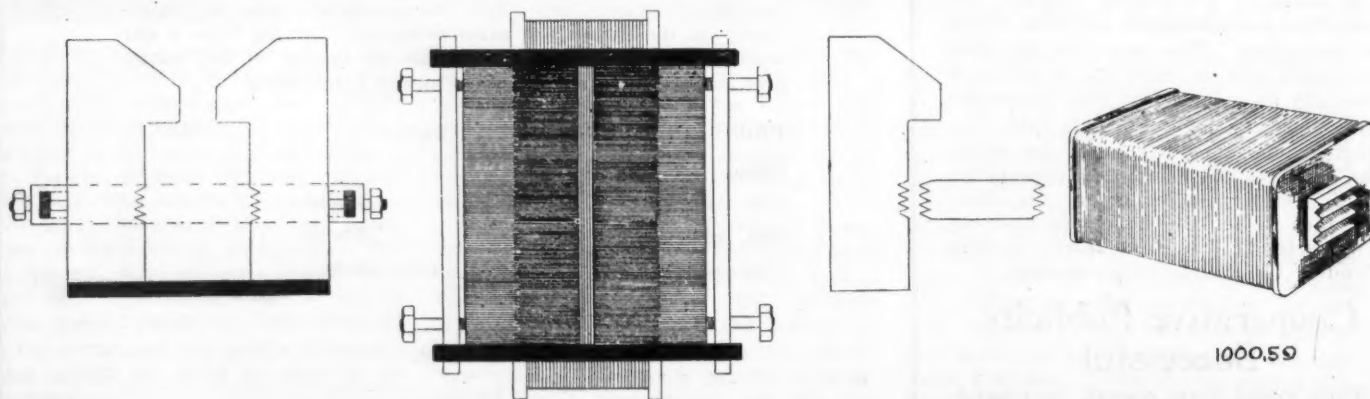


Fig. 1. Detail of armature testing "Growler." Left; sectional view of iron parts. Center; finished apparatus viewed from top. Right; the coil and core

use in building up this wiring system such as push button switches, fuse blocks, porcelain connection blocks, and the like?—W. C. Chapman, 19th Ave. and the Beach, Longport, N. J.

We congratulate you on having worked

out a simple wiring plan which should operate entirely satisfactorily, with the exception that both the bright and dim headlight as well as the dash and tail-light will burn regardless of which of

the headlight switch buttons is turned on. The reason for this is that the dash and tail-light leads connect the leads to the bright and dim bulbs together. We suggest that you either use a five gang switch, wiring the dash and tail-lamp to an independent button, or that you purchase either a Cutler-Hammer or a Briggs-Stratton switch especially designed with internal connections to switch the dash and tail-light circuit to the bright or dim headlight bulb circuit. You should have no trouble in securing the necessary supplies from any first class automobile supply house in your vicinity.

WANTS INSTRUCTIONS FOR MAKING "GROWLER"

Q—Could you tell me how to construct a "growler" for testing armatures?—John Worster, Lincoln, Nebr.

See Fig. 1. As we have stated several times before, you will do better to purchase one of these apparatus from any of several firms specializing in them.

WIRING OF JESCO SYSTEM

Publish wiring diagram of Herff-Brooks, Jesco System. See Fig. 2.

REMODELING OLD ELECTRICAL SYSTEM

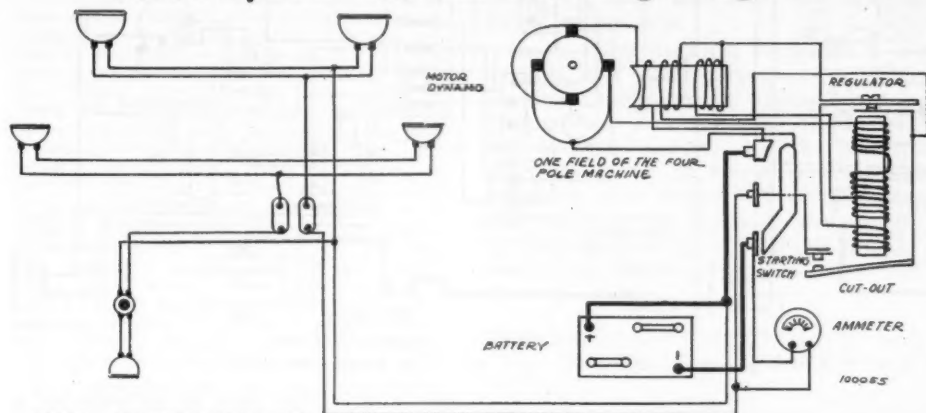
Publish a diagram showing how to change the wiring system of a 1914 B 55 Buick so as to eliminate the mercury tube regulator and the other small devices and not interfere with the starter, cutout, lights or ignition. Can we do this work in our shop or had we better ship the outfit to the factory.—H. J. Conder Motor Co., Darlington, S. C.

See Fig. 4. It will be impossible to eliminate the mercury tube regulator without substituting some other form of regulating device. The Dayton Engineering Laboratories Co., Dayton, O., manufacturers of the system, as well as any of the United Motors Service branches remodel this system, installing a reverse series winding in the fields to effect regulation. This, of course, eliminates the necessity for the mercury tube. We would recommend that you send the generator to either of the above rather than undertake the job yourselves.

The only other unit which might prove troublesome is the automatic circuit breaker which was used on this system in lieu of fuses. This may be cut out of the circuit by putting a "jumper" wire between the points. Should this be done it will be necessary to protect the circuits by inserting fuses into the head and side light leads between the lights and the switch. Or, one fuse may be between the circuit breaker and the switch. The former method is better.

We hardly think you need change the ignition switch as this device is quite reliable. The ignition relay may be disregarded as it operates only when the ignition switch is moved to "Bat.," at which time current is drawn from the dry cells. This part of the system need not be used so long as the storage battery is kept well charged.

Jesco System Standard Wiring Diagram



JESCO STANDARD WIRING 1914

Fig. 2. This view shows only one pole of the motor-generator

Rewiring Diagram for Old Model Cars

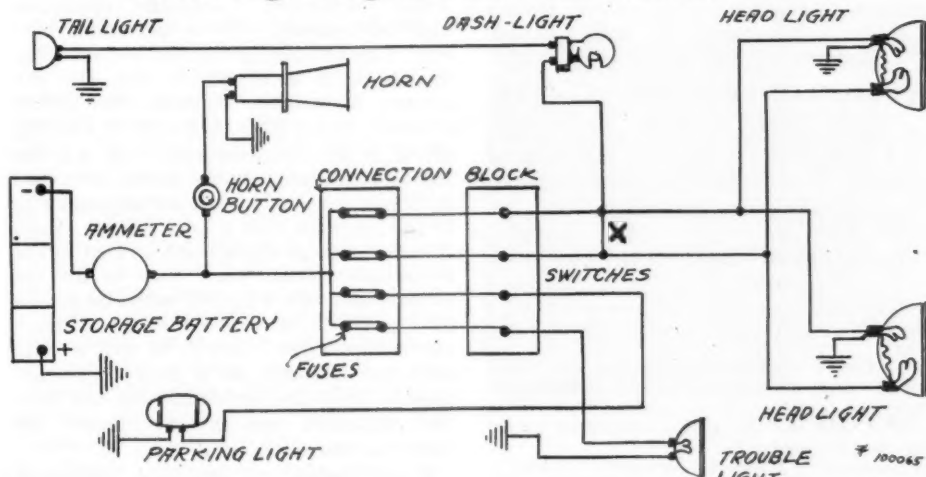


Fig. 3. This diagram was submitted by a reader. An error is indicated by the letter X

Delco System, Circuit Diagram, Buick B 54 & B 55

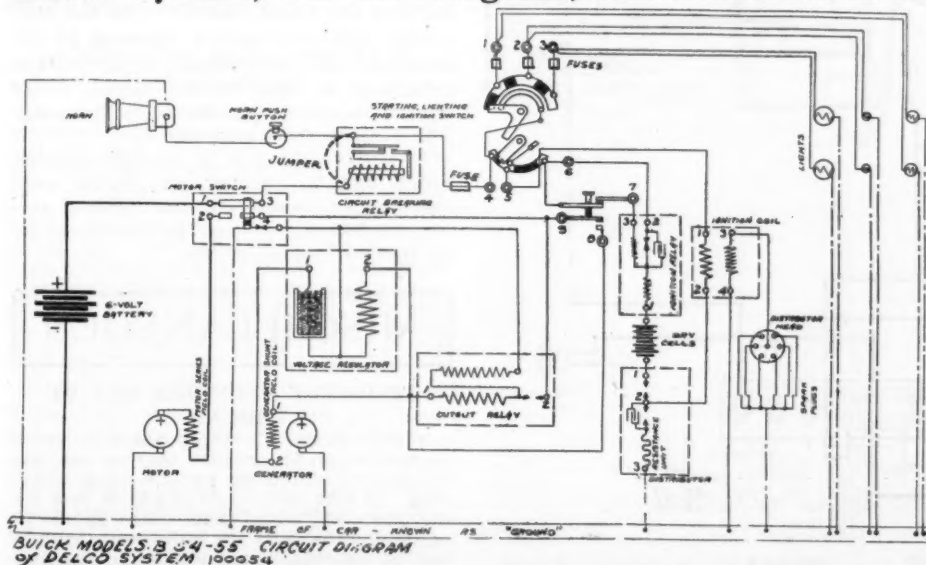
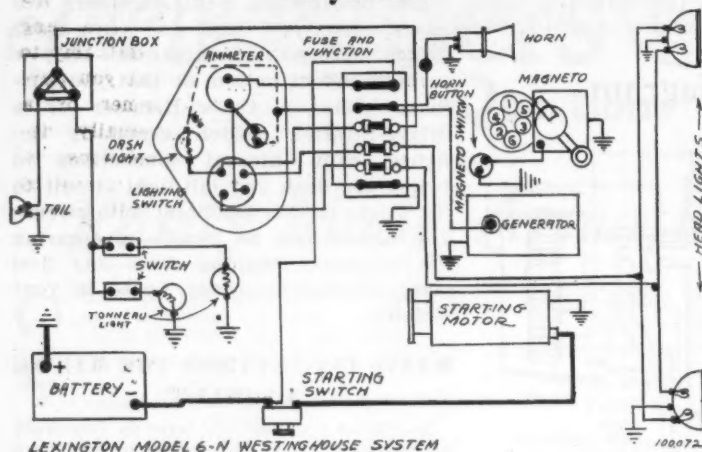


Fig. 4. Simplifying changes suggested in early Delco system

Lexington Model 6—Westinghouse System



Lexington Model 0—Westinghouse System

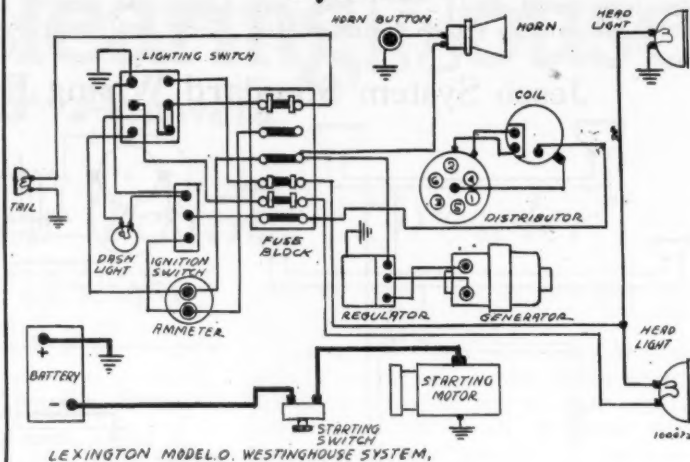


Fig. 5 and Fig. 6. Two distinct Westinghouse installations used on 1916 Lexington cars

TWO LEXINGTON WIRING DIAGRAMS

Q—Publish the wiring diagram of a 1916 Lexington with Westinghouse starting and lighting system.—Wm. Zaier, Jr., Chicago.

There were two models of Lexington cars built in 1916 and each of these had a distinct electrical system, although both were Westinghouse. As you do not mention the model on which you wish to be informed, we are publishing the diagrams for both models. See Figs. 5 and 6.

GENERATOR AND STARTING MOTOR COMMUTATORS

Q—Can you furnish us with a list of the manufacturers of generator and motor commutators, or failing to supply the list, will you notify some of the manufacturers that we are in the market for commutators?—The Armature Service Stations Co., Kansas City, Mo.

The following concerns make a specialty of supplying commutators: Cameron Electrical Manufacturing Co., 205

Main St., Ansonia, Conn.; Columbia Machine Works and Malleable Iron Co., Chestnut St. and Atlantic Ave., Brooklyn, N. Y.; Electrical Materials Co., North East, Pa.; Eureka Co., North East Pa.; Homer Commutator Co., 47-48 Hough Ave., N. E., Cleveland, O.; Toledo Standard Commutator Co., Toledo, O.

CHEVROLET 490 WIRING DIAGRAM

Publish wiring diagram of 1918, 490 Chevrolet which shows the generator cut-out connections as well as the lighting circuits.—Reddy Machine Shop, Orrville, O.

See Fig. 7.

INSTALLING BOSCH MAGNETO ON OAKLAND SIX

Q—Could we install a Bosch D. U. 6 magneto on a 1916 Oakland six-cylinder car?

2—Could it be driven by the generator shaft and supported on a substantial bracket rising from the engine base?

3—Could the lights be connected direct to the generator?

4—Would this give as satisfactory a light as Ford lamps?—The City Garage, August Nihof, Prop., Ignacio, Colo.

1 and 2—It would not be practicable to attempt to lengthen the generator shaft for the reason that this would entail a rather expensive machining operation and the removal of the automatic cut-out. The suggested method of mounting the magneto is shown in Fig. 8. The cutting of a hole through the timing gearcase is a simple matter as is also the fitting of the magneto gear with a housing to be attached to the timing gearcase with cap screws. It will be necessary to fit the magneto with a gear having exactly two-thirds as many teeth as that of the crankcase timing gear; this is for the reason that the magneto must be driven at $1\frac{1}{2}$ times crankshaft speed. Fig. 9 shows the layout. It will be well to support the magneto on a special bracket coming from the crankcase up and over the generator and not to subject the latter to the extra load.

3—It makes no material difference where the lighting wires are attached to the generator-battery system so long as the battery is used. It is the battery, which by absorbing most of the generator output balances the system. Should burning the lights directly from the generator with the battery removed be attempted, the excessively high voltage generated at high engine speed would without question, quickly burn them out. The battery must be retained.

4—If everything is in normal working order and the proper size bulbs used there is no reason why the lighting system should not operate as satisfactorily as that on the Ford car.

Wiring Diagram of Chevrolet Model 490, 1918

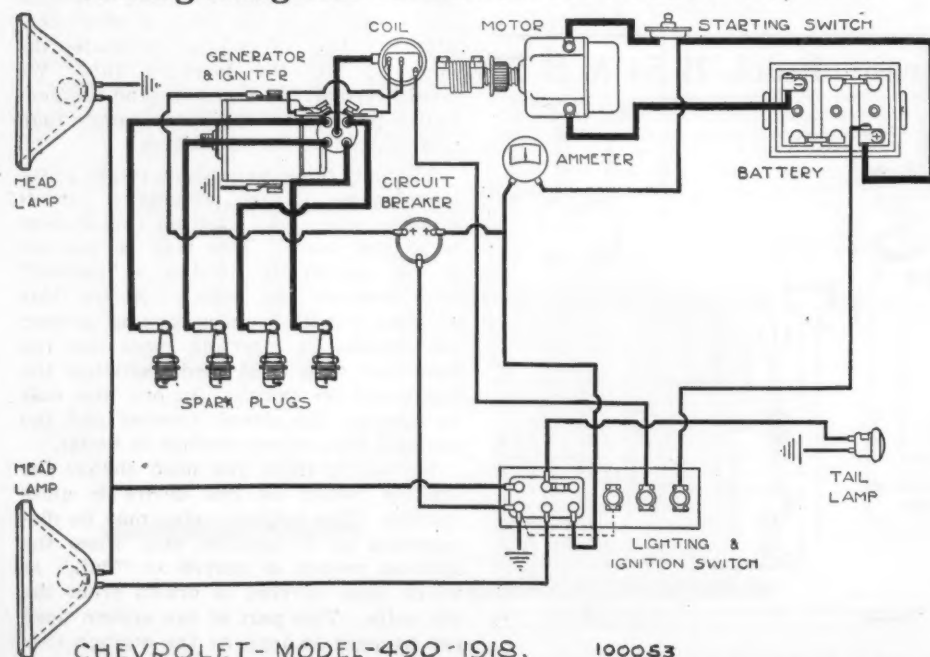


Fig. 7. Negative side of starting motor is grounded

MISCELLANEOUS

PROBABLY CYLINDER OUT OF ROUND

A 1920 model 45 BT Oldsmobile, seven passenger, eight cylinder touring car was fitted with aluminum pistons when delivered. It was held to 20 m.p.h. or less for the first 500 miles and then up to 25 m.p.h. for the next 500 miles with the object of wearing in the pistons in the best possible manner. It has always wasted a great deal of oil—about half a gallon

to from 60 to 90 miles of running most of the time. Heavier oils have been tried and also the oil pressure reduced a little below that recommended, but it makes no difference. Almost any time a cylinder head is removed there is a teaspoonful or more of oil on top of some of the pistons and carbonizing is very frequent, though the plugs foul but little.

At about 5,800 miles light cast iron pistons and a full set of non-leaking piston rings were installed. With the old pistons at the bottom of the stroke the new ones were inserted to see if they fitted. They fitted so well that they would go down by "jumps" as the air escaped by them and could only be pulled out with a strong suction—this without rings. The rings fitted the groove and cylinders perfectly. After again having been driven 20 m.p.h. for 500 miles and all valves re-ground it takes more oil now than before, carbonizes quicker, smokes all the time and fouls the plugs with oil and carbon every little while. The owner is beginning to doubt that the cylinders were ever perfectly round. Total mileage now about 6500. Would you recommend regrounding?—S. Alvin Carpenter, Prairie Home, Mo.

It is recommended that the cylinders be measured with an inside micrometer. If the difference in diameter measured at least ten different points in each varies more than .003 in., regrounding and new pistons and rings will be needed.

HEATING OF CARS SEEMS TO BE EPIDEMIC

Q—We have three cars here, a 1919 model Ford, a 1914 model Ford and a Maxwell which heat badly. The timing, valves, ignition, carburetion and lubrication are all right but they heat just the same. Any suggestions you can give us will be appreciated. We are keeping a file of *MOTOR AGE*.—Aubrey A. Phelps.

As you probably know there are many things which will cause an engine to heat. Among these are an overly rich mixture, running with a late spark, dragging brakes, sediment in the cooling system, partially closed hose connections caused by oil getting into the water and swelling the inside of the hose, oil thinned by gasoline which has passed the pistons and gone down into the crankcase, carbon deposit and weather conditions. As your trouble seems to have happened all at once we are rather inclined to place the blame on the latter. However, you will do well to check over all the points mentioned.

REMODELING FORD INTO FAST SPEEDSTER

Q—We are rebuilding a Ford into a fast speedster and will appreciate any advice you can give us especially on enlarging the valve ports and rebuilding the camshaft for more speed. We would like to have a body that is different from the usual run; something on the order of a racing car. We are using the regular Ford radiator and want the cowl high enough so that only the shoulder of the driver and the passenger are exposed. We also want to drop the frame about four or five inches.—T. MacGregor, Saloman, Kans.

1—We have had very favorable reports of the practice of reaming out the valve seats and ports and installing the Fordson size valve. We would not recommend attempting to change the contour of the standard cam by grinding. Rather do we believe you would do better to procure a high speed camshaft from the D. R. Noonan Company, Paris, Ill., or

the Green Engineering Co., Dayton, O. Special ring and pinion gears can be procured from the Cross Gear & Engine Co., Detroit, or D. R. Noonan, Paris, Ill.

The following concerns specialize in overhead valve heads: Trindl Co., 60 E. 24th St., Chicago; Laurel Motors Co., Anderson, Ind., and Rajo Motor Company, Racine, Wis.

On specially designed bodies we would suggest that you communicate with the Kuempel Company of Guttenberg, Ia. This concern makes a specialty of speedster body designs and has the patterns all worked out to full size scale and drawn on large sheets. These are pasted over the material which is then cut out by simply following the lines of the pattern. The patterns range in price from \$3 to \$5.

PROPER PISTON CLEARANCE FOR CONTINENTAL MOTOR

Q—After a cylinder has been rebored what should be the clearance of the pistons? This is a Red Seal Continental, 6 hp. engine. We want to set these pistons just as close as possible so that when the rings have worn in there will be no slap. We have seen many blocks rebored and

after a hundred miles of running they knock worse than before and never seem to give the service they did before the work was done.—J. S. Preston, Yates, Mo.

The best authorities differ on the question of pistons clearance by a matter of .0005 to .00075 in. One very good one who has a long record of successful piston manufacture to his credit recommends a clearance of .0025 for all pistons of from $3\frac{1}{8}$ to $3\frac{3}{4}$ in. The local representative of the Continental Motor Corp. states that it is the practice of this concern to allow a trifle better than .003 in. in the lands—the spaces between the rings—and .002 in. in the skirt. We believe you would do well to follow these directions.

You speak of reboring. This term is used in a very loose sense, being applied to all operations of cylinder truing regardless of whether these consist of actually reboring, reaming or grinding. It is unfortunately true that actual reboring often leaves much to be desired. However, reaming, if the cylinder is not too much out of round, or grinding, if the departure from truth is great, are usually successful if skillfully done. Nevertheless, the truing of the cylinders is not all there is to the job. In fact, it is merely a good start.

If the pistons are much oversize they should be hand-lapped into an old cylinder—never the refinished one—until they will slip freely into the latter with the proper clearance. Before they are finally installed they should be measured with a micrometer to be certain that they have not been ground out of round in the lapping process. Our experience has been contrary to yours in that we have had occasion to inspect and test many re-ground engines into which new pistons and rings have been accurately fitted and we have found that the job is uniformly successful.

DODGE BROTHERS SERIAL NUMBERS 1920 AND 1921

Q—How can we tell the difference between the 1920, 1921 and 1922 Dodge Brothers roadsters?

2—Can you give us the serial numbers for the beginning of each year?

3—When did they start using longer springs and how much longer are the new springs than the old ones?

4—Have they ceased using yellow finished wire wheels? If so, when did they stop?—Albert H. Tallman, Pontiac, Ill.

1 and 2—The 1920 serial numbers started with, approximately, 423642, while the 1921 numbers started with, approximately, 569070. The 1922 numbers are not yet announced.

3—The first cars with the 2 in. longer springs were produced some time last October.

4—A few cars are still being sent through with the wire wheels. The charge is \$50 above the list price.

WORTHWHILE POINT ON CLUTCH ADJUSTMENT

In adjusting a clutch always be sure that there is plenty of clearance between the pedal lever and the foot board when the clutch is fully engaged.

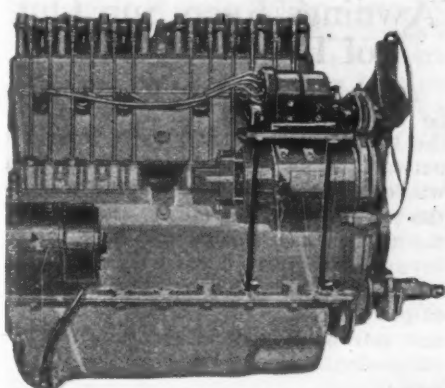


Fig. 8. Suggested method of mounting a magneto on 1916 Oakland

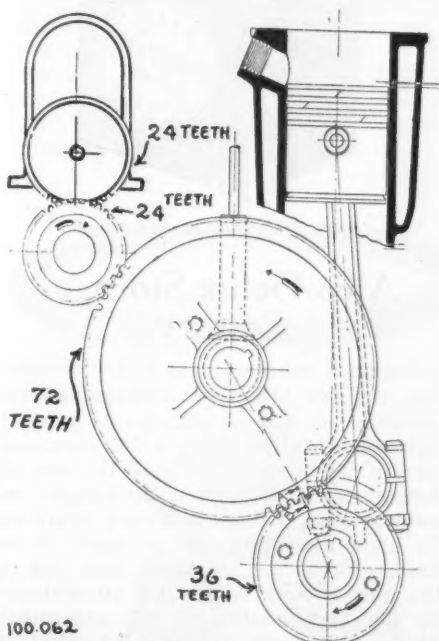


Fig. 9. Oakland 1916 timing and generating gears

The Accessory Show Case

New Fitments for the Car

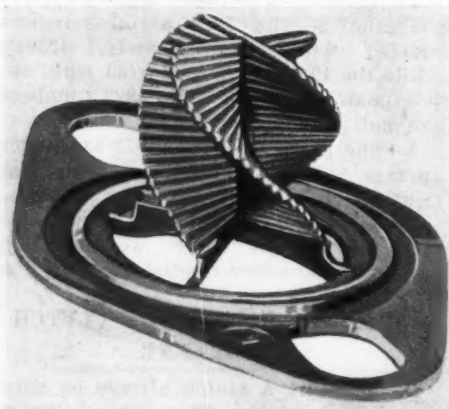
Multipower Gas Distributer Atomizes Gasoline

Described by its manufacturer as the Multipower Friction Gas Distributer, a little auxiliary fuel atomizing and mixing device recently placed on the market, is designed to fit between the carbureter and the intake manifold in such a way that the atomizing element is directly in the path of the inrushing mixture. The friction member is in the form of a four-sided spiral, of brass, with the sides and edges of the metal corrugated along their flat surfaces and serrated along their edges.

The theory of operation is that as the wet gas strikes the device it is given a cyclonically violent whirling movement and that the globules of fuel, impinging upon the corrugation and serration, are literally rent into particles closely approaching the atom in size. The result of this violent pulverizing action is that the droplets, which ordinarily separate from the mixture and condense on the walls of the intake manifold, are so finely subdivided that they mix perfectly with the inrushing air to form as nearly a dry gas as it is possible to obtain. The Multipower is extremely easy to install as the part that fits between the carbureter and the intake manifold flange is of soft metal, making a gasket unnecessary. Manufactured by The Multipower Co., 916 N. Marshfield ave., Chicago.

Low Voltage Electric Fans for Enclosed Cars

Small storage battery operated electric fans, designed for installation in limousine, sedan and coupe bodies are offered by the Knapp Electric and Novelty Co., New York. Weighing but 3½ pounds and fitted with a universally adjustable bracket these handy little



Multipower gas distributor atomizes gasoline

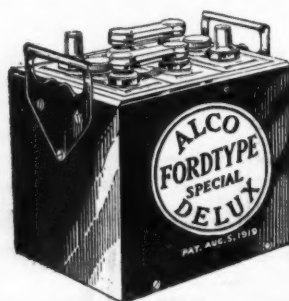


Hindview mirror

breeze creators can be suspended from the ceiling or any other part of the body by means of wood screws. Although it is recommended that a storage battery be used as a source of current, five or six dry cells, connected in series will serve. The fans run at speeds between 1600 and 2000 r. p. m. with a current consumption of only two amp. at six volts. The type "L. S.," listing at \$17.50, has a six inch fan and is handsomely finished in full nickle.

Awnings Keep Sun Out of Enclosed Cars

The Hanson Sunshade is designed to be suspended inside and at the top of the windows of enclosed cars. Extended outward at an angle through the open window, it serves as an awning to stop the rays of the sun during the heat of the day. When not in use it is folded inward and upward and secured to the car roof. These devices, which sell for \$3 per pair, or \$5 for two pairs, are made and marketed by the C. P. Hanson Specialty Co., Niles, Mich.



Alco Delux storage battery

Alco Delux Storage Battery

Designed especially for Ford installation, the new Alco Delux storage battery, retailing at \$25, manufactured by the Cincinnati Storage Battery Co., Moorman Ave., Cincinnati; is suitable for use in either Buick, Chevrolet, Overland or several other of the small cars where an 11 plate assembly may be used. It is asserted that the unusually long life of the new battery is directly attributable to the high quality of the separators used. These are prepared by what is claimed to be an exceptionally efficacious method of treatment.

Patterns for Speedster Bodies

Many dealers who have requests for the building of roadster and speedster bodies on small cars will be interested to learn that the Kuempel Co. of Guttenberg, Ia., are supplying carefully worked out patterns and designs for these operations. The patterns are very much on the order of those used in the cutting out of clothing.

Each part is designated by number and letter and drawn out on full scale sheet. These sheets are pasted over the material which is then cut to size by merely following the lines. The company is handling in addition to the patterns all the necessary parts, such as special ring gears, etc., for the lowering of frames and speeding up of engines and cars. Several types of car designs are available and the prices for the plans range from \$3 to \$5.

Hindview Mirror

A new hindview mirror introduced to the trade by the Kales Stamping Company, Detroit, Mich., is fitted with a ball and socket joint which permits instant adjustment to any angle desired without the necessity of the driver leaving his seat. This feature is most desirable when two or more drivers of different stature operate the car. The device is very easy to attach, it being necessary only to remove one bolt in the bracket, or arm, and insert three wood screws, the heads of which are concealed when the device is assembled. It is made of fine French plate glass, with rounded edges and has a total length of 9 inches. The price is \$3.50, retail.



Knapp low voltage electric fan

Automatic Governor Controls Engine Speed

An easily installed governor for Fordson tractor engines which is in no way connected with the moving parts, has been recently introduced by the Yost Auto Co. of Sutton, Nebr. The device is ingenious in the extreme, depending for its operation on the speed of the fan, which, in its turn is directly dependent upon engine speed.

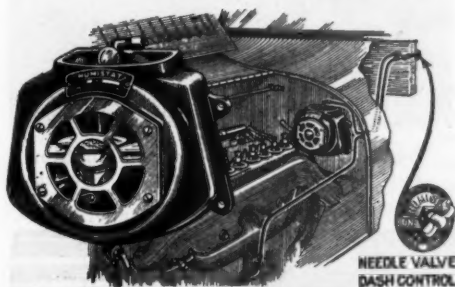
Among the claims made for the apparatus is the fact that as the fan speed is four times that of the camshaft, a more sensitive control is affected than is possible with a centrifugal type of governor. The manufacturers guarantee the control to maintain a constant engine speed within a fluctuation of 10 per cent at all speeds over 700 r.p.m. The device consists of a few simple parts such as the vane, which is acted upon by the fan draft, the throttle rod linkage, etc. Priced at \$10, the Yost company state that the device can be applied by an inexperienced mechanic in a few minutes.

Comfort for Baby in Gordon Motor Crib

To realize the acme of motoring comfort for both mother and baby is the object of the Gordon motor crib manufactured by the Gordon Motor Crib Co., 219 N. State St., Chicago. The carefully thought out fitment is designed to be suspended from the robe rail or from special fittings which attach to the rear of the front seat. The spring suspension is unique and so arranged that all shocks, pitches, and rolling movements of the car are absorbed, the crib remaining practically level under all circumstances. A folding victoria type top protects the occupant from the sun or inclemencies of the weather. Though of ample size to insure comfort the device folds into a small space when not in use.

Humistat Feeds Moisture Saturated Air

A device which, it is claimed duplicates the atmospheric conditions peculiar to foggy weather is the Humistat, manufactured by the Tramont Products Co., 216 High St., Boston, Mass. Controlled from the dash, the Humistat is so designed that it uniformly mixes water-vapor



Humistat feeds moisture saturated air



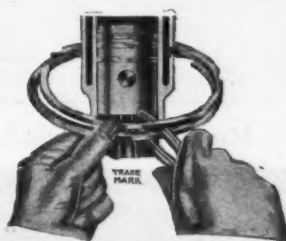
Hammerblow timer

saturated air with the mixture which, it is claimed, keeps the engine running cooler, prevents formation of carbon, and duplicates the after sun-down performance with which all motorists are familiar.

Spyroseal Piston Rings Have Qualities of Steel

Though individually cast from a close grain high grade iron the Spyroseal piston ring is characterized by a steel-like elasticity which, it is claimed, permits of its being sprung and bent to a remarkable degree without danger of breaking. This greatly simplifies its installation as the common danger of breakage is minimized.

In the original casting before heat treatment, the ring is glass hard and brittle, but after having been treated by a special process it possesses the qualities of mild steel, being soft though tough and elastic. It is of the concentric type and is an almost complete two turn spiral, the end coming to within less than one-third of the complete ring diameter on the second turn. The assertion is that this form combined with the elasticity of the ring makes it seat itself quickly and conform to the contour of the cylinder even though the latter should be as much as .0005 to .010 out of round. Manufactured by the Spyroseal Mfg. Co., 1826-28 Gravois Ave., St. Louis, the new ring is being marketed through the jobbing trade.



Spyroseal Piston Ring

Hammerblow Timer Insures Clean Ignition

Characteristically described as "The Timer of An Old-Timer," a new ignition device brought out by the Pro-Mo-Tor Fabricating Corp., New York, successors to Herz & Co., is constructed on the hammerblow break principle. Briefly described, the device is similar to the conventional type of timer with the exception that the contact points consist of a hardened two steel rod which is tightly pressed against a stud of like material. When the cam actuating the instrument rotates these it gives an exceptionally good contact which is abruptly broken as the cam rotates further. The speed of the break is best expressed by the term rupture and is claimed to have the effect of overcoming the electric lag which is the common fault of the average timer.

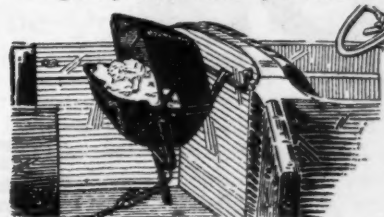
The device being of the highest grade material and workmanship throughout—the housing of cast manganese bronze, and the moving parts of hardened nichrome steel—the claim is that it will last as long as the Ford engine. A further assertion is that the saving in fuel will quickly compensate for the \$5 cost of the device.

Gold Seal Storage Battery Has Long-Lived Plate

The Gold Seal Battery Co. of Green Bay, Wis., announces its 1922 line of replacement batteries designed to fit every make and model of car which may come to the battery service station. Gold Seal storage batteries are characterized by a newly developed plate which, on account of the method of applying and bonding the active material in the staggered type of grid are claimed to be exceptionally long-lived.

Although the grids are of rigid construction and contain something more than the conventional amount of metallic lead, by reason of the disposition of the lateral and vertical ribs, more than the usual amount of active material oxides are retained by them. This fact accounts for the high capacity and long life of the plates.

Another feature of the Gold Seal battery is the handles. These are imbedded in the wood of the box and sealed in by lead slugs. Only the finger holes protrude. The two points of construction eliminate all chance of trouble from corroded screw holes and the premature breaking off of the handles. The hard maple cases are deeply impregnated with several coats of an acid proofing composition and finished with a handsome coat of glossy black battery enamel.



Gordon Motor Crib

Service Equipment

Time Savers for the Shop

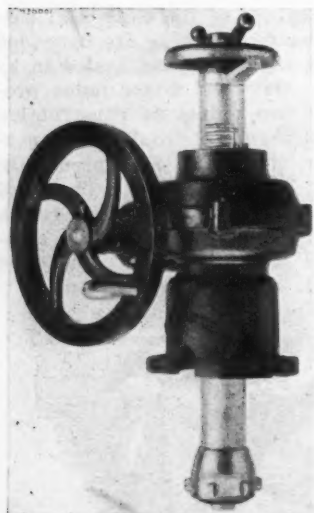
"Pikko" Cleaner Keeps Spark Plugs Hitting

Not a toy or a makeshift, but a really scientifically designed tool is the claim made for "Pikko," the spark plug cleaner which scrapes the carbon from the inside of the shell, the outside of the porcelain and the points, burnishes the latter and also serves as a gage to set them for the correct gap.

The tool is made in the form of a cylinder with the ends machined to form long, springy fingers with sharp ends and edges. The fingers of one end are bent outward at their ends while those of the other are bent inward. These form the picks. The outwardly bent fingers, when inserted into the spark plug shell scrapes the carbon away cleanly. By reversing the tool the inwardly bent ends of the other set of fingers scrape and polish the insulator without, it is claimed, damaging the delicate glaze. After cleaning, the points may be set by means of "Pikko," as the stock is of the correct thickness to form a gage. It is manufactured and distributed by J. P. Davies & Co., 1819 Broadway, New York.

Manly Floor Level Under-Worker

The Manly Manufacturing Co. of York, Pa., is offering the Manly Floor Level Under-Worker. This is a sturdily built all steel trestle so designed that after either end of a car has been lifted up to a 30 deg. angle by means of a single reduction hand operated winch it is held safely and securely in position on two



Master reboring tool



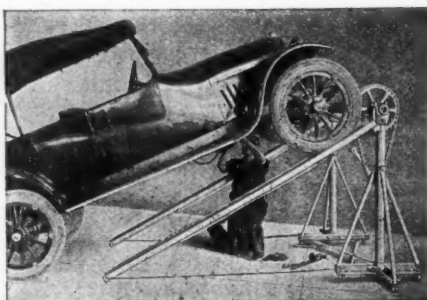
Black & Decker portable drill with wire brush

channel steel runways, or rails. With the aid of the trestle it is possible for the mechanic to be seated under the engine or rear axle when fitting connecting rod bearings or driving gears.

Black & Decker Portable Electric Grinder

An electric grinding apparatus which is light enough to be easily carried to the job is the latest offering of the Black & Decker Manufacturing Co., Baltimore, manufacturers of the well known line of electric drills. The new grinder is powered by a one-half horsepower motor which has a maximum speed of 3200 r.p.m. This power and speed is ample for a grinder wheel of 5 in. diameter and 1 in. face.

While the device was designed as a portable electric grinder it may be used as a bench tool by mounting it on a quick detachable base with which it is supplied. Besides the base the equipment also includes two 5 in. by 1 in. grinding wheels, one fine and one coarse, a wire brush wheel and a cloth buffing wheel. With this complete outfit it is not necessary to buy any extras to take care of any grinding, cleaning, buffing or polish-



Manly automobile trestle

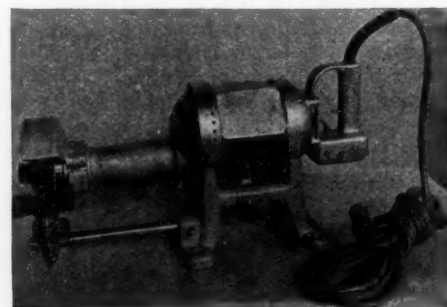
The Master Reboring Tool

That it will rebores a cylinder in ten minutes when operated by hand or five minutes when power driven by an electric motor is the claim made for the Master cylinder reboring tool manufactured by H. D. Taylor, Detroit.

The apparatus is simple in the extreme consisting of a cast iron body which is machined at exact angles to its axis across its base. The body supports a steel sleeve inside of which revolves the shaft which drives the cutter head. This latter part contains the six cutters arranged in such a way that all of them are moved inward or outward to an exactly equal distance by means of a plate with a spiral raceway or thread which engages grooves cut into one side of the cutters.

This adjustable plate also serves the purpose of a clamping plate connected to the end of the bar which extends through the spindle and which carries on the other end an index plate and lock nut. The cutter head may be fed by hand or by the automatic feed. With the latter in operation the longitudinal feed is at the rate of .025 in. per revolution of the spindle which gives 40 turns per inch of forward travel. This rate of feed is so fine that it is claimed a finished cut can be made in one operation without the necessity of again going over the work.

ing jobs around the garage, service station, vulcanizing shop, machine shop or foundry. It is claimed that with the wire brush wheel attached, the carcass of a pneumatic casing can be stripped of the tread in a very short time.



New Black & Decker combination portable and stationary electric grinder



"Pikko" a spark plug cleaner that scrapes the carbon

Legal Problems

Conducted by Wellington Gustin

A Question of Ownership

M bought X car from agent, paying an installment down. Then the General Motors of Oakland, Cal., handled the matter of payments. On the first of April M wished to purchase a Stutz car owned by the same agent; M asked the agent to pay off the balance due on the X car and take a mortgage on the same X car for first payment on the Stutz.

The agent made a new contract reselling the X car for \$800—\$400 cash and \$400 which he gave out on contract to a broker in Hanford, Calif. Now M gets a payment due on the X car from both companies, and M wishes to get the X car clear so as to sell it as soon as General Motors is paid off. But the agent did not do as he stated he would do in taking the mortgage. He resold the X car; this I think he had no right to do. M took the Stutz back to the agent and asked him to take it back and to take the contract off the X car, but he refused to do so.

Can we make him by law? He did an unlawful deed when he resold the X car, for M gave him no bill of sale. He sold the car for \$400, but in the contract he sent to the broker in Hanford, handling the last contract he stated he sold the X car for \$800, with \$400 cash so the Hanford man would handle the contract.—E. R. Knight, Fresno, Calif.

THE QUESTION OF GOOD TITLE

Since the agent did not get a bill of sale or other evidence of title, and since the mortgage on the X car given by M was never paid off, the purchaser of the X car from the agent did not get a good title, unless he could show he was an innocent purchaser of the car for value paid and without notice of any claims against it. The recording of the mortgage properly gives notice to all the world of the claim against the car.

But regarding the agent's liability—he is of course primarily responsible for his own acts. If he did hold a new mortgage on the X car as first payment on the Stutz he did have the right to assign or sell his mortgage and interest in the X car, though no more. He, of course, is personally liable for failure to pay off the balance due as agreed. From your statement he would be liable for misrepresentation and fraud to the broker who handled the balance due on the contract if it can be shown that the \$400 balance due never in fact existed.

CONTRACT MUST BE RESCINDED

Under the facts stated, where the agent procured the sale of his Stutz on the promise to pay off the mortgage on the X car, which he failed and refused to do, and when he afterwards wrongfully resold the X car, M should be able to have the contract rescinded and recover the X car with damages.

Rescission of a contract means that both parties are put as nearly as possible in the same position and condition as before the contract was made.

At Your Service

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.

ONE MAY RATIFY ACTS OF ANOTHER

If M acted in such a manner as to ratify the acts of the agent in selling X car, then the purchasers thereof would have good title as against M.

Then if the agent would not be worth a judgment it would perhaps be advisable for M to retain the Stutz, thus affirming the contract and proceeding directly to recover for the injury done by the agent. The balance due by M on the X car certainly could be set over, as against the agent, for any amount the latter holds against M on the Stutz sale.

The Sales Warranty

In selling an automobile, how may I warrant certain things as to the car for the benefit of the buyer and as required by him?

Warranties may be either verbal or written, and they may be implied as well as expressed. To create a warranty no set form of words is necessary, just so the intention of the parties is expressed or may be inferred from other facts. If the warranty is not written it may be a question for the jury to say whether or not a warranty was intended.

On a written contract of sale there may be implied by law certain accompanying warranties not inconsistent with the writing; but oral warranties may not be proven. The implied warranties are only those necessary to give force and effect to a transaction and to prevent such a failure of consideration as could not have been within the party's contemplation.

When the contract is reduced to writing and no warranty is given there is a presumption that none was made and none exists. However, this presumption may be overcome by evidence to the contrary.

Questions Involving Partnership of Son

Q—I bought a car for \$100 from a man who claimed to be the rightful owner. I paid cash and several days later a man with a constable who had a warrant for the car came and said that he did not sell the car to the man, but that his son, a minor, sold it to him for \$50 down and gave notes for the balance.

Now the owner, Smith, who conducts a grocery store has as the firm name Smith and Son. Smith claims the son had no right to sell the car. I decided to let him have his car back providing he paid me the \$50 which he had received from his son as the first payment on the car.

While waiting trial to decide the rightful owner, I gave a forthcoming bond and took the car back in my possession.

Now Mr. Smith does not want to give me all the \$50 back as he said he would at first, but wants to charge me for the use of the car while in my possession. Kindly tell in your column what you think of this case.—Charleston Auto Wrecking Co., Charleston, W. Va.

It is my opinion that you got a good title to the car, as an innocent purchaser for value, providing you did not know the facts as to dealings between your seller and the minor.

Since the minor son was a partner, or held out to the public as a partner of his father, the father would be, in law, estopped to deny the authority of the son to enter into contract relating to the partnership business. The father apparently holds out to the public that the son is a partner and as such he may contract for the partnership; and if such partnership does not in fact exist then the father has at level made the son his agent in his business dealings. Although minors may not, under certain limitations, be held on their contracts, still they may be agents for principals in negotiating contracts.

If it does appear that the son had no authority to sell the car and could not pass title your action would be against your seller, or at least subrogated to his rights, against the son for fraud. And unless you are entitled to the car then you would be required to pay for the use of the car while you retain same in your possession.

The Order and Contract

I am having difficulty over orders and am not sure when an order is a binding contract. Can you inform me?

An order for goods of any kind is but a proposal to enter into a contract and is not a contract until accepted by the seller. Upon written acceptance, an order becomes an executory contract, and when the seller delivers the goods ordered it becomes executed.

Clutches on 1920 Passenger Cars

Motor Age Maintenance Data Sheet No. 159

One of a series of weekly pages of information valuable to service men and dealers—save this page

NAME AND MODEL	Make	Type	Number of Disks	Facing Material	Size of Thrust or Clutch Bearing		
					Inside Diameter	Outside Diameter	Width
Ace							
Allen, 43	Borg & Beck	Single Plate	2	Asbestos	2	2 ¹⁵ / ₁₆	³ / ₄
American Six, C-60	Borg & Beck	Single Plate	2	Asbestos	2 ¹ / ₄	3 ¹ / ₁₆	³ / ₄
American Beauty	Borg & Beck	Single Plate	2	Raybestos	1 ²⁵ / ₃₂	2 ³ / ₆₄	1 ¹⁹ / ₃₂
Anderson, S30	Borg & Beck	Single Plate	2	Raybestos	2 ¹ / ₄	3 ¹ / ₁₆	³ / ₄
Apperson, 820S	Own	Dry Plate	1	Raybestos	S. K. F.	1205	
Apperson, 820A	Own	Dry Plate	1	Thermoid	S. K. F.	1205	
Auburn, 6-39	Borg & Beck	Single Plate	2	Raybestos	.9842	2.0472	.5905
Beggs, 20T	Borg & Beck	Single Plate	2	Raybestos			
Bour Davis, 21 S. F. R.	Muncie	D. M. Disk	13	Asbestos	6 ³ / ₆₄	2 ³ / ₆₄	1 ¹⁹ / ₃₂
Brewster	Own	Cone		Fabric			
Briscoe, 434	Own	Cone		Leather	2	3	³ / ₄
Buick	Own	D. M. Disk	10	M. Asbestos	2 ¹ / ₈	3 ¹ / ₁₆	6 ¹ / ₆₄
Cadillac, S59	Own	D. M. Disk	17	Raybestos	6 ³ / ₄	7 ³ / ₄	1
Case, W	Borg & Beck	Single Plate	2	Raybestos	2 ¹ / ₄	3 ¹ / ₁₆	³ / ₄
Chalmers, 35C	Own	D. M. Disk	5	W. Asbestos	1 ¹³ / ₁₆	3 ³ / ₈	1 ¹³ / ₁₆
Chandler, 27	Borg & Beck	Single Plate	2	W. Asbestos			
Chevrolet, F. B.	Own	Cone		Leather	⁵ / ₈	1 ²¹ / ₃₂	1 ¹¹ / ₁₆
Chevrolet, 490	Own	Cone		Leather			
Cleveland, 40	Borg & Beck	Single Plate	2	Asbestos	1 ³ / ₄	3 ³ / ₃₂	1 ¹³ / ₁₆
Climber, S20	Muncie	D. M. Disk	14	Raybestos	2 ³ / ₈	3 ³ / ₄	³ / ₁₆
Clydesdale, 12B	Brown-Lipe	D. M. Disk	8	Raybestos			
Cole, 870	Northway	Cone		Leather	2 ³ / ₄	3 ³⁵ / ₆₄	⁷ / ₈
Columbia	Borg & Beck	Single Plate	2	Asbestos	.9842	2.0472	.5905
Commonwealth, 45	Hoosier	Single Plate	1	Raybestos			
Crow-Elkhart	Borg & Beck	Single Plate	2				
Cunningham, V4	Brown-Lipe	D. M. Disk	7	Raybestos	1 ¹³ / ₁₆	3	³ / ₄
Daniels, D.	Own	D. M. Disk	16	W. Fabric	1.771	3.346	.748
Davis	Borg & Beck	Single Plate	2	Raybestos			
Dodge Bros.	Own	D. M. Disk	7	W-Asbestos	3 ⁵ / ₃₂	4 ³ / ₁₆	³ / ₁₆
Dort, 15	Own	Cone		Leather	⁵ / ₈	1 ²⁵ / ₆₄	³ / ₄
Dixie, H.	Borg & Beck	Single Plate	2	Raybestos	1 ³ / ₄	3 ³ / ₃₂	1 ¹³ / ₁₆
Dorris, 6-80	Warner	D. M. Disk	8	Raybestos	2 ⁵ / ₈	3 ³¹ / ₃₂	1 ¹⁵ / ₁₆
Du Pont, A.	Brown-Lipe	D. M. Disk					
Elcar	Borg & Beck	Single Plate	2				
Elgin K.	Borg & Beck	Single Plate	2	Raybestos	1 ³ / ₄	3 ³ / ₃₂	1 ¹³ / ₁₆
Essex, A.	Own	O. M. Disk		Cork Inserts	2.1653	3.937	.8267
Ferris, C20	Borg & Beck	Single Plate	2	Fabric	2 ¹ / ₄	3 ³ / ₈	1 ¹¹ / ₁₆
Fiat, 501	Own	D. M. Disk	37	None			
Franklin, S, 9B	Borg & Beck	Single Plate	2	Ruseo	1.771	3.346	.748
Ford, T.	Own	O. M. Disk	26				
Gardner, G.	Borg & Beck	Single Plate	2	W. Asbestos	1 ³ / ₄	3 ³ / ₃₂	1 ¹³ / ₁₆
Geronimo, 6-A-45	Borg & Beck	Single Plate	2	Raybestos			
Grant, H.	Borg & Beck	Single Plate	2	Raybestos	2	2 ¹⁵ / ₁₆	³ / ₄
Hanson, 54-60	Borg & Beck	Single Plate	2				
Harroun, AA2	Own	Cone		Raybestos			
Haynes, 47	Borg & Beck	Single Plate	2	Raybestos	6 ⁷ / ₈	9 ¹ / ₄	¹ / ₈
Holmes, S-3	Brown-Lipe	D. M. Disk	8	Raybestos	1.771	3.346	.748
Hudson, O.	Own	M. Disk	16	Cork Inserts	1 ⁶³ / ₆₄	3 ¹ / ₁₆	³ / ₁₆
Huffman, R.	Borg & Beck	Single Plate	2	Raybestos	6 ³ / ₆₄	³ / ₆₄	1 ¹⁹ / ₃₂
Hupmobile, R5	Own	D. M. Disk	8	Raybestos	1 ³⁷ / ₆₄	3 ³ / ₆₄	4 ⁴⁵ / ₆₄
Jackson	Borg & Beck	Single Plate	2	Raybestos			
Jones	Borg & Beck	Single Plate	2				
Jordan, M.	Detroit	Dry Plate	2	Raybestos	.9835	2.047	.5905
King, H.	Detroit	Dry Plate	4	Raybestos			
Kissel	Borg & Beck	Single Plate	2		2.578	3.980	.813
Kline Kar	Borg & Beck	Single Plate	2				
LaFayette, 134	Own	Dry Plate	17	M. Asbestos	2	3 ¹ / ₄	⁷ / ₈
Leach-Biltwell, 20A	Brown-Lipe	D. M. Disk	4		.9842	2.0472	.5905
Lexington, S-1920	Borg & Beck	Single Plate	2	Raybestos	2 ¹ / ₄	3 ¹ / ₁₆	³ / ₄
Liberty, C.	Borg & Beck	Single Plate	2	Raybestos	2	2 ¹⁵ / ₁₆	³ / ₄
Lincoln							
Locomobile	Own	Disk					
Lorraine, 20T	Borg & Beck	Single Plate	2		.9842	2.0472	.5905

Concluded next week.

Automotive Repair Shop

Practical Maintenance Hints

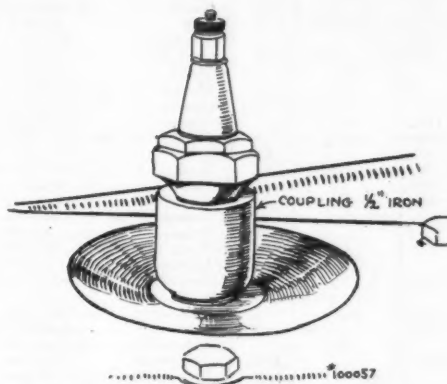
A Remedy for Fouling Plugs

Herewith is a suggested remedy which has been found efficient in overcoming the fouling of plugs in Ford engines. We have noticed from time to time that readers of MOTOR AGE's Clearing House have told of their having trouble with the Ford car's pumping oil and not being able to keep the engine hitting on all four. We had somewhat the same experience until by chance I happened one day to notice an old gentleman tinkering with his Ford. He told me that he had been troubled in the same way with oil pumping and missing and that he had fitted four male and female, one-half inch iron type couplings, one to each spark plug hole and had screwed the spark plugs into the coupling, thereby raising them a good $1\frac{1}{4}$ in. up out of the cylinder.

At first we argued that he would have trouble firing the gas, as his spark plug would not be in the cylinder but up in the pocket made by the coupling. But by actual experience, it was proved that he got better power and just as easy starting as before he fitted the extension and that his plugs were always nice and clean.

We had four couplings fitted to one of the Navy Recruiting Fords on duty here and we are more than satisfied with the result. I would like to pass this experience along and see if others get the same benefit as we did. It seems to me that if it works well with a Ford it ought to prove just as beneficial to any other engine with spark plugs in the head.—Harvey L. Hodge, Chief Machinist's Mate, U. S. Navy Recruiting Station, Indianapolis.

(This expedient is well worth trying as the cost should be but little.—ED.)



Simple fitting pocket spark plug prevents fouling

floor. With the tray in an elevated position an effective guard against the dangerous flying chips is provided. The materials for this tray are galvanized sheet iron for the pan and a piece of brass tube for the support.

Repair Shop

COOPERATION is the keynote of the automotive industry this year and will become more important as time goes on. Motor Age is pleased to extend an invitation to its readers, wherever they may be, to contribute short articles and sketches on easy or improved ways of doing hard things, which they may have worked out and thus lend their aid in **HELPING THE OTHER FELLOW**. Correspondence among contributors is also strongly urged. Let's get together and make this a happy family with one end in view, that of hearty, unselfish **COOPERATION**.

Reserve Gas Supply for Fords

A simple device which can be easily attached on a Ford, and which will insure against the possibility of the car's running out of gas, is a reserve supply tank consisting of a two quart can fastened to the front side of the dash and connected by means of a small pipe line to the line supplying the carburetor.

In attaching this tank, it is necessary to cut the line running from the gasoline tank proper to the carburetor and to insert in the break a "T" coupling. From this is run a small copper tubing which is soldered to a hole in the under side or the bottom of the reserve tank. Somewhere between the "T" coupling and the reserve tank, a small valve is installed for the cutting off of this supply. By filling the tank and, when an emergency arises, opening this valve, enough gas will be found available to run the car several miles.

The connections should be threaded, with the exception of the tubing connection to the reserve tank bottom, which may be made by soldering. If the threads are smeared with lead, there will be no trouble from leaking.

It will be well to consume the reserve supply from time to time, being certain that there is plenty of fuel in the main tank when this is done, for the reason that the small quantity quickly becomes stale and may be found useless in the emergency to meet which the outfit is installed.

Replacing Ring Gears and Bevel Pinions

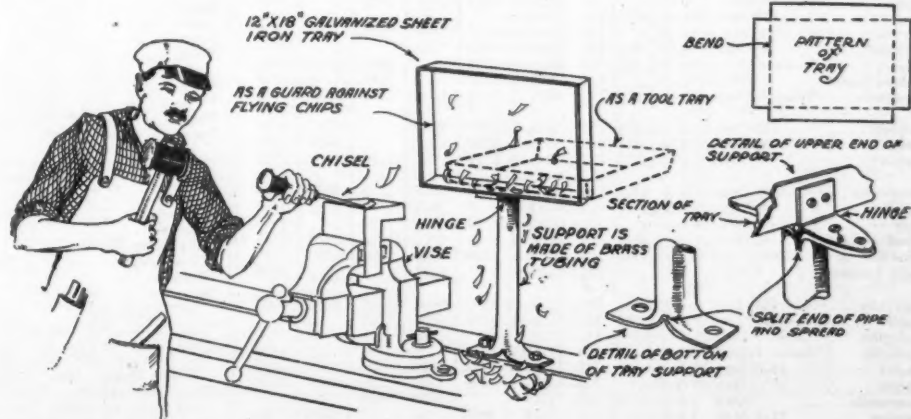
When replacing bevel ring gears or pinion it is best to use a pair that has been mated and run in at the factory. Failure to do so usually results in a noisy axle.

Combined Tool Tray and Chipping Screen

A fixture used by a mechanic in a repairshop and well worth copying consists of a combined tool tray and guard for preventing chips from flying while chipping in the vise. A rectangular pan about twelve inches by eighteen inches is set on a support and secured to the bench at the left side of the vise.

It is hinged and when lowered affords a serviceable tray with a ledge for holding small tools, screws and other machine parts.

The pan shape of the tray prevents round pieces from rolling off onto the



Combined tool tray and chipping screen

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....G	Guy	6-31x5	123	32x4	\$2975	\$2975		\$3680	\$3680	Maibohm.....B	Falls	6-31x4 1/2	116	32x4	\$1575	\$1575	\$1750	\$2395	\$2395
Ace.....H	H-S.	6-31x5	123	32x4	2975	2975		3680	3680	Marmont.....34	Ow.	6-31x5 1/2	136	32x4 1/2	4185	4385	3085	4875	5275
Ace.....L	H-S.	4-31x5	116	32x4	2260	2260				Maxwell.....25	Ow.	4-31x5 1/2	109	30x3 1/2	845	845		1445	1545
Allen.....Series 43	Ow.	6-31x5	110	32x4	\$1385	1385		2195		McFarlan.....1921	Ow.	6-41x6	140	33x5	6300	6300	6300	7500	7500
Ambassador.....R	Cont.	6-31x5 1/2	136	33x5	\$4500		\$4500	6500		Mercer.....Series 5	Ow.	4-31x6 1/2	132	32x4 1/2	4500	4500	4500	5700	6200
American.....C	H-S.	6-31x5 1/2	127	32x4	2195	2275	2350	3150		Metz.....R & RR	Cont.	6-31x4 1/2	119	32x4	2245	2245			
Anderson.....Series 40	Cont.	6-31x5 1/2	120	33x4	2195	1795	1845	2795		Meteor.....Duos.	4-41x6	129	32x4 1/2	5500	5500				
Apperson.....8-21-S	Ow.	8-31x5	130	34x4 1/2		\$3000	3250	4500	4500	Metz.....MG	Rut.	6-31x5	120	32x4	1995	1995		2795	2895
Apperson.....Anniversary	Ow.	8-31x5	130	34x4 1/2		\$3500	3750			Mitchell.....F-40	Ow.	6-31x5	120	33x4	\$1490	1490	\$1700	2590	2690
Auburn.....6-39	Cont.	6-31x4 1/2	120	33x4		1695	1695	2795	2795	Mitchell.....F-42	Ow.	6-31x5	127	33x4			1995		
										Moller.....A	Ow.	4-21x4	100	27x3 1/2	2000				
Beggs.....20T	Cont.	6-31x4 1/2	120	33x4	1775	1775		2675	2775	Monroe.....S-9 & 10	Ow.	4-31x4 1/2	115	32x3 1/2	1295	1295			
Bell.....4-32	H-S.	4-31x5	114	31x4		1495				Monroe.....S-11 & 12	Ow.	4-31x4 1/2	115	33x4			2075	2175	
Bell.....6-50	H-S.	6-31x5	124	32x4		1695				Moon.....6-48	Cont.	6-31x5 1/2	122	32x4	2085	1985	2485	2985	2985
Biddle.....81	Buda.	4-31x5 1/2	121	32x4	3475	3475		3975		Murray-Mac Six.....	Ow.	6-31x5 1/2	128	34x4 1/2	4250	4250			
Birch Super Four	Left.	4-31x5 1/2	108	30x3 1/2	1195	1195		1595	2295	Nash.....681-7	Ow.	6-31x5	121	33x4	1525	1545	1695	2395	2695
Birch Light Six	Left.	6-31x5 1/2	117	33x4	1595	1595				Nash.....682	Ow.	6-31x5	127	34x4 1/2			1695		
Birch Light Six	H-S.	6-31x5 1/2	126	33x4 1/2	\$2385	2385	2385			Nash Four.....4-1	Ow.	4-31x5	112	32x3 1/2	1175	1195		1735	1935
Bour-Davis.....21S	Cont.	6-31x5 1/2	125	32x4 1/2	7000	7000		10500		National Sixteen.....4B	Ow.	6-31x5 1/2	130	32x4 1/2	2990	2990	2990	3990	3990
Brewster.....91	Ow.	4-31x5 1/2	109	31x4	1085	1085		1685	1685	Nelson.....D	Ow.	4-31x4 1/2	104	32x4	1900				
Briscoe.....S-21 A	Ow.	2-31x5 1/2	90	28x3						Noma.....1C	Cont.	6-31x4 1/2	123	32x4 1/2	3000	3200		4450	
Brook.....1922-41-5-6-7	Ow.	6-31x5 1/2	118	33x4 1/2	1495	1525		2325	2435	Northway.....430-KS	Lye.	4-31x5	116	32x3 1/2		1135		5600	5400
Buick.....1922-48-9-50	Ow.	6-31x5 1/2	124	34x4 1/2			1735	2325	2635										
Buick.....E.C.4	Lye.	4-31x5	116	33x4		1245				Oakland.....34-C	Ow.	6-21x4 1/2	115	32x4	1095	1145		1625	1725
Buick.....E.C.6	Rut.	6-31x5	116	33x4	1295	1575		2030	2150	Ogren.....6-60	Ow.	6-31x5 1/2	134	33x5	3850	3750	3900	5000	5400
										Oldsmobile.....43-A	Ow.	4-31x5 1/2	115	32x4	1325	1345		1895	2100
Cadillac.....59	Ow.	8-31x5 1/2	132	34x4 1/2	3790	3790		4950	6190	Oldsmobile.....37A	Ow.	6-21x4 1/2	112	32x4	1450	1450		2145	2145
Carroll.....C	Roth.	6-31x5	128		3985	3985				Oldsmobile.....46	Ow.	8-21x4 1/2	122	33x4 1/2		1825	1875		2775
Carroll.....D	Roth.	6-31x5	128		3185	3185				Oldsmobile.....47	Ow.	8-21x4 1/2	115	32x4		1725	2225	2425	
Case.....V	Cont.	6-31x5 1/2	126	34x4 1/2		2250	2900	3285		Overland.....4	Ow.	4-31x5 1/2	100	30x3 1/2	695	695		1000	1275
Chalmers.....6-30	Ow.	6-31x5 1/2	122	33x4 1/2		1495	1545	2295	2445	Packard.....Single-Six	Ow.	6-31x4 1/2	116	33x4 1/2	2975	2975		3750	3975
Chalmers.....6-30	Ow.	6-31x5 1/2	122	33x4 1/2			1795			Packard.....Twin Six	Ow.	12-31x5	136	33x5	4850	4850	4850	6600	6800
Champion.....Tourist	Lye.	4-31x5	113	32x3 1/2		1095				Paige.....6-42	Ow.	6-31x5	119	32x4	1635	1635	1925	2450	2570
Champion.....Special	H-S.	4-31x5	118	32x4	1395	1395				Paige.....6-66	Cont.	6-31x5	131	33x4 1/2	2975	3295	2875	3755	3830
Chandler.....Six	Ow.	6-31x5	123	33x4	1785	1785	1785	2785	2885	Pan American.....A	Ow.	4-31x5	108	33x4		2000			
Chevrolet.....49B	Ow.	4-31x4	102	30x3 1/2	635	645		1155	1195	Pan American.....E & F-55	H-S.	6-31x5 1/2	121	33x4	2000	2000			
Chevrolet.....49B	Ow.	4-31x4	110	33x4	1185	1185		1885	1885	Parenti.....1921	Ow.	8-21x4 1/2	125	32x4		2000			3000
Cleveland.....40	Ow.	6-31x5 1/2	112	32x4	1295	1295		2195	2295	Paterson.....650	Ow.	6-31x4 1/2	120	33x4		1895	1925	2895	2895
Climber Four	H-S.	4-31x5	117	32x4	1450	1355				Peelless.....56-S-7	Ow.	8-31x5	125	34x4 1/2		12990	2090	3680	3950
Climber Six	S-H.	6-31x5	125 1/2	32x4 1/2	2250	2250				Peters.....4-30	Ow.	2-31x5 1/2	90	28x3	885				
Cole.....870	North.	6-31x5 1/2	127	33x5	2580	2695	2795	3995	3995	Piedmont.....6-40	Cont.	6-31x4 1/2	122	32x4		1495			
Columbia.....D-C & CS	Cont.	6-31x4 1/2	115	32x4	1795	1795		2495	2595	Piedmont.....6-40	Cont.	6-31x4 1/2	122	32x4		1495			
Columb.....C-53	Cont.	6-31x5 1/2	125	33x4 1/2		2350	2450	3650		Pierce-Arrow.....	Ow.	6-41x6	138	35x5	8000	7500	7500	8500	9000
Commonwealth.....44	H-S.	4-31x5	117	32x4		1595		2465		Pilot.....6-45	Tector	6-31x5	120	32x4	1945	1895			
Crawford.....21-6-40	Cont.	6-31x5 1/2	122 1/2	32x4	3000	3000		4500		Pilot.....6-50	H-S.	6-31x5	126	32x4 1/2	2285	2285	2335	3250	3400
Crow-Elkhart.....L63-65	Lye.	4-31x5	117	32x3 1/2	1295	1295				Porter.....40	Ow.	4-41x6 1/2	142	35x5	6750	Chassi	3890		
Crow-Elkhart.....S63-65	H-S.	6-31x5	117	33x4	1545	1545		2395		Premier.....6-D	Ow.	6-31x5 1/2	126 1/2	33x5	3790	13690	3890	4690	5190
										Premocar.....6-40 A	Falls.	6-31x4 1/2	117	32x3 1/2		1295			
Daniels.....D-19	Ow.	8-31x5 1/2	132	34x4 1/2	\$5350	\$5350	5350	6250	6950	Raleigh.....A-6-60	H-S.	6-31x5	122	32x4 1/2	2250	2250		3100	3200
David.....61-67	Cont.	6-31x5 1/2	120	33x4	1995	1895	2150	2795	2795	R & V Knight.....R	Ow.	4-31x5	116	32x4		2150		2850	2950
Dispatch.....Wise	Ow.	4-31x5	120	34x4	1250	1350	1350	1525	1575	R & V Knight.....T	Ow.	6-31x4 1/2	127	32x4 1/2	3350	3350	3350	4000	4200
Dixie Flyer.....H-S-70	H-S.	4-31x5	112	32x4	1445	1445		2295	2345	Reo.....T-6	Ow.	6-31x5	120	33x4	1850	1850		2700	2750
Dodge Brothers.....	Ow.	4-31x5 1/2	114	32x3 1/2	935	985		1585	1785	Rever.....C	Dues.	4-31x6	131	32x4 1/2	4550	4650	4650	6500	
Dorris.....6-80	Ow.	6-41x6	132	33x5		4785	4785	5800	6000	Roamer.....6-54-E	Cont.	6-31x5 1/2	138	32x4 1/2				2450	2750
Dort.....17-12	D-Ly	4-31x5	108	31x4	985	985		1535	1685	Romer.....	Cont.	6-31x4 1/2	120	32x4	2000	2000	2100	2450	2750
Dupont.....A	Ow.	4-31x5 1/2	124	32x4 1/2	3400	3400		4900		Rolls-Royce.....	Ow.	6-41x6 1/2	143 1/2	33x5	U. S. Chassi	a Prior	11750		
										Saxon.....125	Ow.	4-31x5	112	32x4		1495		2295	2295
Elcar.....K-4	Lye.	4-31x5	117	33x4	1300	1300		2500	2600	Sayers Six.....DP	Cont.	6-31x4 1/2	118	33x4	2495	2195		3295	
Elcar.....7-R	Cont.	6-31x4 1/2	117	33x4	1700	1700		2395	2395	Scraps-Booth.....B-39-52	North.	6-21x4 1/2	115	32x4	1275	1295		1950	2100
Elgin.....K-1	Falls.	6-31x4 1/2	118	33x4	1595	1495		1050	2300	Scraps-Booth.....	Cont.	6-31x4 1/2	115	32x4	1470	1490		2350	2375
Essex.....	Ow.	4-31x5	108 1/2	32x4	1445	1445				Seneca.....I & O	Left.	4-31x4 1/2	108	30x3 1/2	1045	1045			
Fergus.....S-5-21	Ow.	6-31x5 1/2	126	33x4 1/2		Chassi	Price	8500		Severin.....Six	Cont.	6-31x5 1/2	122	33x4	1485	1485		2100	2250
Ferris.....	Cont.	6-31x5 1/2	130	32x4 1/2	3350		3350	4100		Severin.....Six	Cont.	6-31x5 1/2	122	33x5	2550	2550	2550	3200	3350
Ford.....T	Ow.	4-31x4	100	30x3 1/2	**370	415		695	760	Sheridan.....4	North.	4-31x5 1/2	116	33x4	1485	1485		2060	2360
Franklin.....9-B	Ow.	6-31x4	115	32x4	2550	2650	2550	3650		Sheridan.....8	North.	8-31x4 1/2	132	33x5					
Friend.....Four	Ow.	4-31x4 1/2	112	32x3 1/2	1285	1285		1985	2085	Skelton.....35	Lye.	4-31x5	112	32x3 1/2	1295	1295			
Gardner.....G	Lye.	4-31x5	112	32x3 1/2	1995	1995		1795		Southern Six.....660-2	H-S.	6-31x5	127	32x4 1/2	2875	2875	2995		
Globe.....B-10	Supr.	4-31x5	115	32x4						Standard.....	Ow.	8-31x5	127	34x3 1/2	3400	3400	3400	4500	4500
Grant.....Six	Ow.	6-31x4 1/2	116	32x4	1550	1550		2450	2450	Stanley Steamer.....	Ow.	2-41x6	130	34x4 1/2	2800	2600	2600	3775	3850
										Stanwood Six.....	Cont.	6-31x4 1/2	118	33x4	2050	2050		2950	
H.C.S.....	Weid																		

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason	3 1/2	\$1650	3 1/2 x 5	34 x 5 1/2	34 x 5 1/2	W	Cook, 41	2	\$3000	4 x 5 1/2	36 x 8 1/2	38 x 7 1/2	I	Gary, I	1 1/2	\$2550	4 x 5 1/2	36 x 3 1/2	36 x 5	W
Acason, R	1 1/2	2260	3 1/2 x 5 1/2	36 x 3 1/2	36 x 5	W	Corbett, E	1	2200	3 1/2 x 5	34 x 3 1/2	34 x 4	W	Gary, J	2 1/2	3150	4 1/2 x 5 1/2	36 x 4	36 x 7	W
Acason, RB	2 1/2	2485	3 1/2 x 5 1/2	36 x 3 1/2	36 x 6	W	Corbett, D	1 1/2	2600	3 1/2 x 5	36 x 3 1/2	36 x 5	W	Gary, K	3 1/2	4050	4 1/2 x 6	36 x 5	40 x 5 1/2	W
Acason, H	3 1/2	3295	4 1/2 x 5 1/2	36 x 4	36 x 4 1/2	W	Corbett, C	2	3150	4 1/2 x 5 1/2	36 x 3 1/2	36 x 7	W	Gary, M	5	5150	5 x 6 1/2	36 x 6	40 x 6 1/2	W
Acason, L	3 1/2	4295	4 1/2 x 5 1/2	36 x 5	36 x 5 1/2	W	Corbett, B	2 1/2	3300	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Gersix M	1 1/2	3100	4 x 5 1/2	36 x 3 1/2	36 x 7	W
Acason, M	5	5250	5 x 6 1/2	36 x 6	40 x 12	W	Corbett, A	3 1/2	4100	4 1/2 x 5 1/2	36 x 5	36 x 10	W	Gersix K	2 1/2	3500	4 1/2 x 5 1/2	36 x 4	36 x 8	W
Ace, C	1 1/2	2295	3 1/2 x 5 1/2	34 x 3 1/2	34 x 5	W	Corbett, AA	5	5000	4 1/2 x 6	36 x 6	40 x 6 1/2	W	Gersix	3 1/2	4500	4 1/2 x 6	36 x 5	40 x 12	W
Ace, A	2 1/2	2795	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Cyclone	1 1/2	2800	3 1/2 x 5	34 x 5 1/2	36 x 6 1/2	I	Giant, 15-A	1 1/2	2250	3 1/2 x 5	34 x 3 1/2	34 x 5	W
Acme, G	3 1/2	...	3 1/2 x 5	35 x 5 1/2	35 x 5 1/2	W	Dart, S	1 1/2	...	3 1/2 x 5 1/2	34 x 3 1/2	34 x 6	W	Giant, 16	2	3150	4 1/2 x 5 1/2	36 x 4	36 x 7	W
Acme, B	1	...	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Dart, M	2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Giant, 17	3 1/2	4150	4 1/2 x 5 1/2	36 x 5	36 x 8 1/2	W
Acme, F	1 1/2	...	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Dart, W	3 1/2	...	4 1/2 x 6	36 x 5	36 x 10	W	Globe D-20	3 1/2	1495	3 1/2 x 5	33 x 4 1/2	33 x 4 1/2	B
Acme, A	2	...	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Day-Elder, A	1	2225	3 1/2 x 5	34 x 3 1/2	34 x 4	W	Globe	1	1495	3 1/2 x 5	33 x 5	33 x 5	B
Acme, C	5	...	4 1/2 x 6	36 x 6	40 x 10	W	Day-Elder, B	1 1/2	2425	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Golden West, GH	3	5000	4 1/2 x 6	36 x 7	36 x 7	W
Acme, E	5	...	4 1/2 x 6	36 x 6	40 x 12	W	Day-Elder, D	2	2900	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Golden West, G	3 1/2	4500	4 1/2 x 5 1/2	36 x 6 1/2	36 x 6 1/2	W
Akr'n Multi-Trk20	1	1905	4 x 5 1/2	34 x 5	34 x 5	B	Day-Elder, C	2 1/2	3125	4 1/2 x 5	36 x 4	36 x 7	W	Golden West, H	3 1/2-4	5000	4 1/2 x 6	36 x 6 1/2	36 x 6 1/2	W
All-Power, C	3 1/2	5800	4 1/2 x 6	36 x 7	36 x 10	W	Day-Elder, F	3	3950	4 1/2 x 5 1/2	36 x 5	36 x 5 1/2	W	Golden West, T	4	5500	4 1/2 x 6	36 x 6	36 x 6	W
All-American, B-1	1 1/2	1795	3 1/2 x 5	32 x 4	32 x 4	I	Day-Elder, E	5	4875	4 1/2 x 6	36 x 5	36 x 6 1/2	W	Golden West, K	7	6000	5 1/2 x 6	36 x 6	36 x 6	W
All-American C-1	1 1/2	2195	3 1/2 x 5	34 x 4	34 x 5	I	Dearborn, F	1 1/2	2180	3 1/2 x 5 1/2	34 x 4	34 x 5	W	Golden West, HA	7	6000	4 1/2 x 6	36 x 6	36 x 10	W
American, 25	2 1/2	3350	4 x 6	36 x 4	36 x 4 1/2	W	Dearborn, 48	2	2590	3 1/2 x 5 1/2	35 x 5 1/2	34 x 7 1/2	W	Gove, A-1	2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 7	I
American, 40	4	4275	4 1/2 x 6	36 x 5	36 x 5 1/2	W	Defiance, G	1	1975	3 1/2 x 5	35 x 5 1/2	35 x 5 1/2	I	Graham Bros. A	1 1/2	2495	3 1/2 x 5	35 x 5 1/2	36 x 6 1/2	I
Apex, G	1	1675	3 1/2 x 5	33 x 5 1/2	33 x 5 1/2	I	Defiance, D	1 1/2	2550	3 1/2 x 5	35 x 5 1/2	36 x 6 1/2	I	Gramm-Bern, 10	1	1495	3 1/2 x 5	33 x 5 1/2	33 x 5 1/2	I
Apex, D	1 1/2	1915	3 1/2 x 5 1/2	34 x 3 1/2	34 x 4	I	Defiance, E	2	2750	3 1/2 x 5	35 x 5 1/2	36 x 7 1/2	I	Gramm-Bern, 15	1 1/2	2050	3 1/2 x 5	33 x 5 1/2	36 x 5 1/2	I
Apex, E	2 1/2	2695	4 1/2 x 5 1/2	36 x 4	36 x 7	I	DeKalb, E2 1/2	2	2600	4 1/2 x 5 1/2	36 x 4	36 x 6	W	Gramm-Bern, 65	1 1/2	2725	3 1/2 x 5	36 x 3 1/2	36 x 5	W
Apex, F	3 1/2	3975	4 1/2 x 6	36 x 5	36 x 10	I	DeKalb, E2	2 1/2	2250	4 1/2 x 5 1/2	34 x 3 1/2	36 x 5	W	Gramm-Bern, 20	2	3175	4 1/2 x 5 1/2	36 x 4	36 x 7	W
Armleder, 20	1	...	3 1/2 x 5 1/2	34 x 3 1/2	34 x 5	W	DeMartini 1 1/2	1 1/2	2600	3 1/2 x 5	34 x 3 1/2	34 x 6	W	Gramm-Bern, 25	2 1/2	3575	4 1/2 x 5 1/2	36 x 4	36 x 4 1/2	W
Armleder, HW	2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 7	W	DeMartini 2	2	3300	4 x 5 1/2	36 x 3 1/2	36 x 7	W	Gramm-Bern, 35	3 1/2	4375	4 1/2 x 5 1/2	36 x 5	40 x 5 1/2	W
Armleder, KW	3 1/2	...	4 1/2 x 6	36 x 5	36 x 5 1/2	W	DeMartini 3	3	4250	4 1/2 x 5 1/2	36 x 4	36 x 10	W	Gramm-Bern, 50	5	5275	4 1/2 x 6	36 x 6	40 x 6 1/2	W
Atco, B	1 1/2	...	3 1/2 x 5 1/2	34 x 5 1/2	36 x 6	I	DeMartini 4	4	4800	4 1/2 x 6	36 x 5	36 x 12	W	Hahn, J4	1	...	3 1/2 x 5	34 x 5	34 x 5	W
Atco, B1	1 1/2	...	3 1/2 x 5 1/2	34 x 5 1/2	36 x 6 1/2	I	Denby, 12	1	1625	3 1/2 x 5	35 x 5	36 x 6	I	Hahn, CD	1 1/2	...	4 1/2 x 5 1/2	36 x 3 1/2	36 x 6	W
Atco, A	2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 8	W	Denby, 33	1 1/2	2300	3 1/2 x 5	35 x 5 1/2	36 x 7 1/2	I	Hahn, EE	2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 8	W
Atlas, MD	1	...	3 1/2 x 5	32 x 4 1/2	32 x 4 1/2	W	Denby, 134	2	2600	3 1/2 x 5	36 x 3 1/2	36 x 6	I	Hahn, F	3 1/2	...	4 1/2 x 5 1/2	36 x 5	36 x 10	W
Atterbury, 20R	1 1/2	2775	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Denby, 25	3	3300	4 1/2 x 5 1/2	36 x 4	36 x 7	I	Hahn, EF	5	...	4 1/2 x 6	36 x 6	40 x 12	W
Atterbury, 7CX	2 1/2	3375	4 1/2 x 5 1/2	36 x 4	36 x 4 1/2	W	Denby, 27	4	4200	4 1/2 x 5 1/2	36 x 5	36 x 5 1/2	I	Hal Fur, E	1	2350	4 x 5	35 x 5 1/2	35 x 5 1/2	W
Atterbury, 7D	3 1/2	4175	4 1/2 x 5 1/2	36 x 5	40 x 5 1/2	W	Denby, 210	5	4850	4 1/2 x 5 1/2	36 x 6	40 x 6 1/2	I	Hal Fur, B	2 1/2	3250	4 1/2 x 5 1/2	35 x 5	38 x 7	W
Atterbury, 8E	5	5575	4 1/2 x 6	36 x 5	40 x 6 1/2	W	Dependable, A	3 1/2	1630	3 1/2 x 5	34 x 5	36 x 6	W	Hal Fur, F	3 1/2	4250	4 1/2 x 5 1/2	36 x 6 1/2	40 x 10 1/2	W
Autocar, 21UF	1 1/2	2300	4 1/2 x 5 1/2	34 x 4	34 x 5	D	Dependable, C	2 1/2	2650	3 1/2 x 5 1/2	34 x 3 1/2	34 x 5	W	Hall	1 1/2	3100	3 1/2 x 5	34 x 5 1/2	34 x 5 1/2	W
Autocar, 21UG	1 1/2	2400	4 1/2 x 5 1/2	34 x 4	34 x 5	D	Dependable, D	2	2650	4 x 5 1/2	34 x 5	36 x 6	W	Hall	2 1/2	3275	4 1/2 x 5 1/2	36 x 4	36 x 6	W
Autocar, 26Y	...	4350	4 1/2 x 5 1/2	34 x 5	36 x 10	D	Dependable, E	2	2950	4 1/2 x 5 1/2	36 x 4	36 x 7	W	Hall	3 1/2	4100	4 1/2 x 5 1/2	36 x 5	36 x 5 1/2	W
Autocar, 26-B	...	4500	4 1/2 x 5 1/2	34 x 5	36 x 10	D	Dependable, G	3 1/2	3550	4 1/2 x 6	36 x 6	38 x 7	W	Hall	5	5100	4 1/2 x 5 1/2	36 x 5	40 x 6 1/2	W
Available, H1 1/2	1 1/2	2750	4 x 5 1/2	36 x 3 1/2	36 x 5	W	Diamond-T, O	1	2500	3 1/2 x 5 1/2	34 x 5 1/2	36 x 6 1/2	W	Hall	7	5100	4 1/2 x 5 1/2	36 x 5	40 x 6 1/2	C
Available, H2 1/2	2 1/2	3475	4 x 5 1/2	36 x 4	36 x 8	W	Diamond-T, FS	1 1/2	2960	3 1/2 x 5 1/2	36 x 3 1/2	36 x 5	W	Harvey, WEA	1 1/2	2550	4 1/2 x 5 1/2	34 x 3 1/2	34 x 5	W
Available, H3 1/2	3 1/2	4475	4 1/2 x 5 1/2	36 x 5	40 x 5 1/2	W	Diamond-T, T	1 1/2	2650	3 1/2 x 5 1/2	36 x 3 1/2	36 x 5	W	Harvey, WFA	2 1/2	3300	4 1/2 x 5 1/2	36 x 4	36 x 7	W
Available, H5	5	5375	4 1/2 x 6	36 x 6	40 x 12	W	Diamond-T, U	2	3285	4 x 5 1/2	36 x 4	36 x 7	W	Harvey, WHA	3 1/2	4300	4 1/2 x 6	36 x 5	36 x 5 1/2	W
Available, H7	7	6000	5 x 6	36 x 6	40 x 14	W	Diamond-T, K	3 1/2	4675	4 1/2 x 5 1/2	36 x 5	36 x 5 1/2	W	Harvey, WKA	5	5200	4 1/2 x 6	36 x 6	40 x 6 1/2	W
Avery	1	...	3 x 4	34 x 5 1/2	34 x 5 1/2	I	Diamond-T, EL	5	5400	4 1/2 x 6	36 x 6	40 x 6 1/2	W	Hawkeye, K	1 1/2	2365	3 1/2 x 5 1/2	34 x 3 1/2	34 x 5	I
Beck, A. Jr.	1	1800	3 1/2 x 5	34 x 3 1/2	34 x 4	I	Diamond-T, S	5	5650	4 1/2 x 6	36 x									

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Kelly-S, K-45	4	\$4550	4 1/2 x 6 1/2	36x5	40x6d	C	Ogden, A1	1 1/2	\$2550	3 1/2 x 5	36x3 1/2	36x5	W	Service, 71	3 1/2	\$4285	4 1/2 x 5 1/2	36x5	36x5d	W
Kelly-S, K-50	5	4900	4 1/2 x 6 1/2	36x6	40x6d	C	Ogden, E	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W	Service, 76	3 1/2	4485	4 1/2 x 6	36x5	36x5d	W
Kelly-S, K-60	6	5100	4 1/2 x 6 1/2	36x6	40x7d	C	Old Hickory, W	1	2175	3 1/2 x 5	36x3 1/2	36x4*	W	Service, 101	5	5275	4 1/2 x 6	36x6	40x6d	W
Keystone, 40	2	2450	3 1/2 x 5 1/2	34x5 1/2	38x7 1/2	I	Old Reliable, A	1 1/2	2350	4 x 5	34x4	36x6	W	Signal, NF	1	2475	4 1/2 x 5	34x5 1/2	36x6 1/2	W
Kimball, AB	2	3675	4 x 6	36x4	36x7	W	Old Reliable, B	2 1/2	3500	4 1/2 x 6	34x4	36x4d	W	Signal, H	1 1/2	2925	4 1/2 x 5 1/2	34x4	36x6	W
Kimball, AC	2 1/2	3975	4 1/2 x 6	36x4	36x8	W	Old Reliable, C	3 1/2	4250	4 1/2 x 6	36x5	36x5d	W	Signal, J	2 1/2	3275	4 1/2 x 5 1/2	34x4	36x8	W
Kimball, AK	3	4500	4 1/2 x 6	36x4	36x10	W	Old Reliable, D	5	5250	4 1/2 x 6	36x6	40x6d	W	Signal, M	3 1/2	4275	4 1/2 x 5 1/2	36x5	40x5d	W
Kimball, AE	4	5000	4 1/2 x 6	36x5	40x12	W	Old Reliable, KLM	7	6000	4 1/2 x 6 1/2	36x6	40x7d	C	Signal, R	5	5300	4 1/2 x 6	36x6	40x6d	W
Kimball, AF	5	5975	5 x 6	36x6	40x7d	W	Oldsmobile Econ.	1	1500	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	I	Southern, 10	1	2090	3 1/2 x 5	34x3 1/2	34x4	W
Kissel, Express	1	1985 1/2	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	W	Olympic, A	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x7	W	Southern, 15	1 1/2	2590	3 1/2 x 5 1/2	36x6 1/2	34x4	W
Kissel, Utility	1 1/2	2775	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Oneida, A-9	1 1/2	2350	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Southern, 20	2	2990	3 1/2 x 5 1/2	36x6 1/2	40x8*	W
Kissel, Freighter	2 1/2	3475	4 1/2 x 5 1/2	36x4	36x7	W	Oneida, B-9	1 1/2	2915	4 x 5 1/2	36x4	36x7	W	Standard, 1-K	1-1 1/2	1950	3 1/2 x 5	34x3 1/2	34x5*	W
Kissel, H. D.	4	4475	4 1/2 x 5 1/2	36x5	36x5d	W	Oneida, C-9	2 1/2	3390	4 x 5 1/2	36x4	36x7	W	Standard, 76	2 1/2-3	3100	4 1/2 x 5 1/2	36x4*	36x7*	W
Kleiber, AA	1	2600	4 1/2 x 5 1/2	34x3 1/2	34x5*	W	Oneida, D-9	3	4345	4 1/2 x 5 1/2	36x5	36x10	W	Standard, 66	3 1/2-4	4000	4 1/2 x 5 1/2	36x5	36x10	W
Kleiber, AB	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2	36x6*	W	Oneida, E-9	5	5400	4 1/2 x 5 1/2	36x6	40x12	W	Standard, 5-K	5-6	5250	4 1/2 x 6	36x6	40x12	W
Kleiber, BB	2	3600	4 1/2 x 5 1/2	36x4*	36x7*	W	Orleans, A	1 1/2	2750	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Sterling, 1 1/2	1 1/2	3200	4 x 5 1/2	36x3 1/2	36x6*	W
Kleiber, B	2 1/2	4200	4 1/2 x 5 1/2	36x5*	36x8	W	Orleans, B	2 1/2	3250	4 1/2 x 5 1/2	36x4*	36x7*	W	Sterling, 2	2	3500	4 x 5 1/2	36x4	36x6	W
Kleiber, C	3 1/2	4900	4 1/2 x 5 1/2	36x5	36x5d	W	Orleans, C	3 1/2	3750	4 1/2 x 5 1/2	36x4 1/2	36x8	W	Sterling, 2 1/2	2 1/2	3650	4 1/2 x 5 1/2	36x4*	36x4d*	W
Kleiber, D	5	5600	5 x 6 1/2	36x6	40x12	W	Orleans, D	5	4250	4 1/2 x 5 1/2	36x6	40x8	W	Sterling, 3 1/2	3 1/2	4650	4 1/2 x 5 1/2	36x5*	40x5d*	W
Koehler, D	1 1/2	....	3 1/2 x 5	34x3 1/2	34x5	W	Oshkosh, A	2	3750	3 1/2 x 5	36x6 1/2	36x6 1/2	4	Sterling, 5-W	5	5500	5 x 6 1/2	36x6*	40x6d*	W
Koehler, M	2 1/2	....	4 x 5 1/2	36x4	36x7	W	Oshkosh, AA	2	3850	3 1/2 x 5	36x6 1/2	36x6 1/2	4	Sterling, 5-C	5	6000	5 x 6 1/2	36x6	40x6d	C
Koehler, MCS	2 1/2	....	4 x 5 1/2	36x4	36x7	W	Oshkosh, BB	2 1/2	4150	4 x 5 1/2	36x7 1/2	38x7 1/2	4	Sterling, 7 1/2	7 1/2	6500	5 x 6 1/2	36x6	40x7d	C
Koehler, F	3 1/2	....	4 1/2 x 5 1/2	36x5	36x10	W	Oshkosh, BB	2 1/2	4300	4 x 5 1/2	36x7 1/2	38x7 1/2	4	Stewart, 11	3 1/2	1350	3 1/2 x 5	32x4 1/2	32x4 1/2	I
Koehler, MT, Trac	5	....	4 x 5 1/2	36x4	36x7	W	Packard, EC	....	3500	4 1/2 x 5 1/2	36x4	36x7	W	Stewart, 15	1	1875	3 1/2 x 5	35x5 1/2	35x5 1/2	I
L.M.C., 2-20	2 1/2	2540	4 1/2 x 5 1/2	36x4	36x4d	I	Packard, ED	....	4100	4 1/2 x 5 1/2	36x5	36x5d	W	Stewart, 9	1 1/2	2200	3 1/2 x 5	34x3 1/2	34x5	I
Lange, B	2 1/2	3350	4 1/2 x 5 1/2	36x4*	36x6*	C	Packard, EF	....	4500	5 x 5 1/2	36x6 1/2	40x6 1/2	W	Stewart, 7	2	2800	4 1/2 x 5 1/2	34x4	34x7	I
Larabee, U	1 1/2	2400	3 1/2 x 5	34x3 1/2	34x5	W	Packard, EX	....	4000	4 1/2 x 5 1/2	36x6 1/2	40x6 1/2	W	Stewart, 7-X	2 1/2	2950	4 1/2 x 5 1/2	34x4	34x7	I
Larabee, K	2 1/2	3400	4 1/2 x 5 1/2	36x4	36x7	W	Paige, 52-19	1 1/2	2880	4 x 5 1/2	34x3 1/2	34x6	W	Stewart, 10	3 1/2	3850	4 1/2 x 5 1/2	36x5	36x5d	I
Larabee, L	3 1/2	4200	4 1/2 x 5 1/2	36x5	36x5d	W	Paige, 54-20	2 1/2	3400	4 1/2 x 5 1/2	34x4	34x4d	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 5 1/2	36x5	36x5d	I
Larabee, W	5	5100	4 1/2 x 6	36x6	40x6d	W	Paige, 51-18	2 1/2	4285	4 1/2 x 5 1/2	36x5	36x5d	W	Stoughton, A	1	1995	3 1/2 x 5 1/2	34x4 1/2	35x5 1/2	W
Lion, L	1	2350	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Parker, F20	2	3500	4 x 6	34x4	36x4d	W	Stoughton, B	1 1/2	2350	3 1/2 x 5 1/2	36x3 1/2	36x5	W
Luedinghaus, C	1 1/2	2100	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Parker, J20	3 1/2	4400	4 1/2 x 6	36x5	40x5d	W	Stoughton, D	2	2800	4 x 5 1/2	36x4	36x7	W
Luedinghaus, W	2-2 1/2	3150	4 1/2 x 5 1/2	36x4*	36x7*	W	Parker, M20	5	5500	4 1/2 x 6	36x6	40x6d	W	Stoughton, F	3	3600	4 1/2 x 5 1/2	36x5d	36x5d	W
Maccari, L	1 1/2	2925	4 1/2 x 5 1/2	36x4	36x6	W	Patriot, Reverse	1 1/2	1785	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Sullivan, E	2	3350	4 1/2 x 5 1/2	36x4*	36x7*	W
Maccari, H-2	2 1/2	3750	4 1/2 x 5 1/2	36x4	36x4d	W	Patriot, Lincoln	1 1/2	2450	4 x 5 1/2	34x3 1/2	34x5*	W	Sullivan, H	3 1/2	4650	4 1/2 x 6	36x5	36x5d	W
Maccari, M-2	3 1/2	4500	4 1/2 x 6	36x5	36x5d	W	Patriot, Wash'tn	2 1/2	3450	4 1/2 x 5 1/2	36x4*	36x7*	W	Superior, D	1	1650	3 1/2 x 5	34x4 1/2	34x4	I
Maccari, G	5	5500	4 1/2 x 6	36x5	40x6d	W	Piedmont, 4-30	2 1/2	1685	3 1/2 x 5	34x4 1/2	34x4 1/2	W	Superior, E	2	2600	4 1/2 x 5 1/2	36x4	36x6	I
MacDonald, A	7 1/2	5750	4 1/2 x 6	40x7	40x14	I	Pierce-Arrow	2	3750	4 x 5 1/2	36x4	36x4d	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4	36x8	W
Mack, AB D.R.	1 1/2	3450	4 x 5	36x4	36x3 1/2	d	Pierce-Arrow	3 1/2	4950	4 1/2 x 6 1/2	36x5	36x5d	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5	40x5d	W
Mack, AB	1 1/2	3400	4 x 5	36x4	36x4d	C	Pioneer, 59	1	1550	3 1/2 x 4 1/2	32x4 1/2	32x4 1/2	W	Super Truck, 100	5	5300	4 1/2 x 6	36x5	40x12	W
Mack, AB Chain	1 1/2	3000	4 x 5	36x4	36x3 1/2	d	Pittsburgh, B 21	2 1/2-3	3800	4 1/2 x 5 1/2	36x5*	36x7*	W	Super Truck 150	7 1/2	6300	5 x 6	36x6	40x7d	W
Mack, AB Chain	2	3300	4 x 5	36x4	36x4d	C	Pony	4	2840	2 1/2 x 4	28x3 1/2	28x3 1/2	C	Texas, A38	3 1/2	1095	3 1/2 x 5	33x4	33x4	I
Mack, AB D.R.	2	3300	4 x 5	36x4	36x4d	C	Power, F	1 1/2	....	3 1/2 x 5 1/2	36x6	36x6	W	Texas, TK39	1 1/2	1550	3 1/2 x 5	36x6	38x7	W
Mack, AC Chain	3 1/2	4950	5 x 6	36x5	40x5d	C	Power, C	3 1/2	....	4 1/2 x 5 1/2	36x5	40x10	W	Tiffin, GW	1 1/2	2695	4 1/2 x 5 1/2	36x3 1/2	36x5	W
Mack, AC Chain	5	5500	5 x 6	36x6	40x6d	C	Premocar, B-143	1 1/2	2475	3 1/2 x 5	36x6 1/2	36x6 1/2	W	Tiffin, MW	2 1/2	3580	4 1/2 x 5 1/2	36x4	26x3 1/2	W
Mack, AC Chain	6 1/2	5750	5 x 6	36x7	40x7d	C	Rainier, R-11	1 1/2	2150	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Tiffin, PW	3 1/2	4760	4 1/2 x 5 1/2	36x5	40x5d	W
Mack, AC Chain	7 1/2	6000	5 x 6	36x7	40x7d	C	Rainier, R-19	1 1/2	2350	3 1/2 x 5	34x3 1/2	31x4	W	Tiffin, F50	5	5850	4 1/2 x 6	36x6	40x6d	

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Ward-LaF., 5A	5	\$3590	5 x 6 1/2	36x6	36x6	W	Wichita, O	3 1/2	\$4000	4 1/2 x 6	36x5	36x5d	W	Winther, 430	1 1/2	\$2850	3 1/2 x 5	32x4	32x4	I
Watson, E	1	1865	3 1/2 x 5 1/2	34x4 1/2	34x4 1/2	W	Wichita, S	5	5000	4 1/2 x 6	36x6	40x6d	W	Winther, 39	1 1/2	2450	3 1/2 x 5	34x3 1/2	34x5	I
Watson, N	3 1/2	4250	4 1/2 x 5 1/2	36x5	36x10	W	Wilcox, AA	1	2100	3 1/2 x 5 1/2	36x4	36x4	W	Winther, 49	2	3250	4 x 5	34x4	34x4d	I
Western, W1 1/2	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2	36x5	W	Wilcox, B	1 1/2	2775	4 1/2 x 5	36x4	36x5	W	Winther, 70	3 1/2	4200	4 x 5	34x4	36x5d	I
Western, L1 1/2	1 1/2	2550	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Wilcox, D	2 1/2	3300	4 1/2 x 5	36x4	36x3 1/2	W	Winther, 450	4	3690	4 x 5	34x5	36x6	I
Western, W2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W	Wilcox, E	3 1/2	4250	4 1/2 x 6	36x5	36x5d	W	Winther, 109	5	5250	4 1/2 x 6	36x6	40x5d	I
Western, L2 1/2	2 1/2	3250	4 1/2 x 6	36x4	36x7	W	Wilcox, F	5	5200	4 1/2 x 6 1/2	36x5	40x6d	W	Winther, 140	7	5900	5 x 6	36x6	40x7d	I
Western, W3 1/2	3 1/2	4250	4 1/2 x 6	36x5	40x5d	W	Wilson, F	1 1/2	2270	3 1/2 x 5	36x3 1/2	36x5	W	Wisconsin B	1 1/2	1950	4 x 5 1/2	34x5 1/2	34x5 1/2	W
White, 15	2	2400	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	B	Wilson, EA	2 1/2	2825	4 1/2 x 5 1/2	36x4	36x7	W	Wisconsin C	2 1/2	2250	4 1/2 x 5 1/2	34x5 1/2	36x8	W
White, 20	3	3250	4 1/2 x 5 1/2	36x5	40x5d	D	Wilson, G	3 1/2	3685	4 1/2 x 5 1/2	36x5	36x5d	W	Wisconsin D	2 1/2	3500	4 1/2 x 5 1/2	36x5 1/2	36x10	W
White, 40	5	4500	4 1/2 x 5 1/2	36x6	40x6d	D	Wilson, H	5	4520	4 1/2 x 6	36x6	40x6d	W	Wisconsin E	3 1/2	4000	5 x 6 1/2	36x6 1/2	36x12 1/2	W
White Hick., E	1	2450	3 1/2 x 5	34x5 1/2	34x5 1/2	W	Winther, 751	3 1/2	1795	3 1/2 x 5	34x4 1/2	35x5 1/2	I	Witt-Will, N	2 1/2	2750	3 1/2 x 5	36x3 1/2	36x7	W
White Hick., H	1 1/2	2750	3 1/2 x 5	34x5 1/2	36x5	W	*2-cyl. 16-cyl. 18-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.													
White Hick., K	2 1/2	3350	4 1/2 x 5 1/2	36x5	36x5	W	Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional.													
Wichita, K	1	2300	3 1/2 x 5	36x3	36x4	W	†Pneumatic Tires. All others solid. ††—Price includes body.													
Wichita, L	1 1/2	2600	3 1/2 x 5 1/2	36x3 1/2	36x5	W	‡—Price includes several items of equipment.													
Wichita, M	2	2800	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Wolverine, J	1 1/2	2125	3 1/2 x 5	34x5	34x5	I	Wolverine, J	1 1/2	2125	3 1/2 x 5	34x5	34x5	I
Wichita, R	2 1/2	3000	3 1/2 x 5 1/2	36x4	36x7	W	Wolverine, J	2 1/2	2640	4 1/2 x 5	36x5	36x5	I	Wolverine, J	2 1/2	2640	4 1/2 x 5	36x5	36x5	I
Wichita, RX	2 1/2	3600	4 1/2 x 6	36x4	36x8	W	Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	B	Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	B
														Yellow Cab M21	1 1/2	2050	3 1/2 x 5	32x4	32x4	B
														Yellow Cab M41	1 1/2	2350	3 1/2 x 5	34x4 1/2	34x4 1/2	W

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	
All-In One	16-30	\$1975	3	Clim.	4-5 x 6 1/2	GDK	3-4	Gray . . . 1920	18-36	\$2000	3	Wauk	4-4 1/2 x 6 1/2	Gas.	4	Port Huron. A	12-25	\$1700	4	Chief	4-4 1/2 x 6	G.K	3	
Allis-Chalm. B	6-12	925	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Ground Hog	19-31	2000	4	Erd.	4-4 x 6	GorK	3	Post. D	12-20	1800	4	Wauk	4-4 1/2 x 5 1/2	GorK	2	
Allis-Chal. G.P	6-12	850	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K.	4	Prairie Dog. L	9-18	650	3	Wauk	4-3 1/2 x 5 1/2	Gas.	2	
Allis-Chalm. . C	12-20	1495	2	Mid.W	4-4 1/2 x 5 1/2	Gas.	2-3									Prairie Dog. D	15-30	1250	4	Wauk	4-4 1/2 x 6 1/2	Gas.	3	
Allis-Chalm.	18-30	2150	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Hart-Parr. 20	20	995	4	Own	2-5 1/2 x 6 1/2	K.D	3	Ranger Cul.	8-16		4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	
Allis-Chalm.	10-18	875	4	Own	4-4 1/2 x 6 1/2	G.K	4	Hart-Parr. 30	30	1505	4	Own	2-6 1/2 x 7	K.D	3	T-20	15-30	2250	4	Dom	4-4 1/2 x 6	K.	3	
Allwork. 2-G	14-28	1875	4	Own	4-4 1/2 x 6	GorK	3	Heider. . . . D	9-16	1170	4	Wauk	4-4 1/2 x 5 1/2	G.K	2	Reed. A-1	18-36	2400	4	Dom	4-5 x 6	Gas.	4	
Allwork. . . . C	14-28	1675	4	Own	4-5 x 6	GorK	3	Heider. . . . C	12-20	1395	4	Wauk	4-4 1/2 x 6 1/2	G.K	3	Reliable	10-20	985	4	Own	2-6 x 7	Ker.	2	
AndrewsKin.D	18-36	2500	4	Clim.	4-5 x 6 1/2	GorK	4	Heider. . . . Cult	6-10	1050	4	LeR.	4-3 1/2 x 4 1/2	Gas	1	Rex.	12-25	1600	4	Wauk	4-4 1/2 x 5 1/2	GorK	3	
Appleton	12-20	1500	4	Buda	4-4 1/2 x 5 1/2	G.K	2-3	Hicks	20-30		4		4-4 1/2 x 6	GorK	4	Russell	12-24	1500	4	Own	4-4 1/2 x 5 1/2	GorK	2-3	
Aro 1921	3-5	550	4	Own	1-4 1/2 x 5	Gas.	1	Huber Light 4	12-25	1185	4	Wauk	4-4 1/2 x 5 1/2	GorK	3	Russell	15-30	2200	4	Own	4-5 x 6 1/2	GorK	3-4	
Aultman-T.	15-30	2200	4	Clim.	4-5 x 6 1/2	G.K	4	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3	Russell	20-35	3000	4	Own	4-5 1/2 x 7	GorK	4-5	
Aultman-T.	22-45	3850	4	Own	4-5 1/2 x 8	G.K	6									Russell	30-60	5000	4	Own	4-8 x 10	GorK	8-10	
Aultman-T.	30-60	5000	4	Own	4-7 x 9	G.K,D	8	Illinois, Super	18-36	2500	4	Clim.	4-5 x 6 1/2	G,K	4	Samson. . . . M		995	4	Nov.	4-4 x 5 1/2	G,K	2	
Automot. B-3.	12-24	1785	4	Herc.	4-4 x 5 1/2	Gas.	2-3	Drive. C	40-70	5000	4	Own	4-7 1/2 x 9	G,K,D	10	Sandusky. . . J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2	
Avery,SR,Cul	5-10		3	Own	4-3 x 4	G.K.		Imperial. . . F	5-10		2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Sandusky. . . E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4	
Avery. Cult-C	5-10		3	Own	6-3 x 4	G.K.		Indiana. . . . F	8-16	1000	4	Own	4-4 1/2 x 5	G,K,D	2	Shawnee Com.	6-12		2	LeR.	4-3 1/2 x 4 1/2	Gas.	10	
Avery. B			4	Own	6-3 x 4	G.K.		International.	15-30	1950	4	Own	5-1 1/2 x 8	G,K,D	4	Shawnee Com.	9-18		2	Gray	4-3 1/2 x 5	Gas.	4	
Avery. C			4	Own	2-5 1/2 x 6	G,K,D	2-3	International.								Shelby. . . . D	15-30		4	Beav.	4-4 1/2 x 6	G,K	3	
Avery	8-16		4	Own	4-4 1/2 x 6	G.K,D	2-3	J-T. N	20-40	3485	*2	Chief	4-4 1/2 x 6	G,K,D	3-4	Shelby. . . . C	10-20		4	Erd.	4-4 x 6	GorK	2-3	
Avery	12-20		4	Own	2-6 1/2 x 7	G.K,D	3-4	Klumb. F	16-32	1650	4	Clim.	4-5 x 6 1/2	Gas	4-6	Short Turn. .	20-40	1500	3	Beav.	4-4 1/2 x 6	G,K	3	
Avery	12-25		4	Own	2-6 1/2 x 7	G.K,D	3-4	Knudsen, 1920	25-45	2500	4	Own	4-5 x 9	Gas	1	Square T. . . A	18-35	2075	3	Clim.	4-5 x 6 1/2	K,G	3	
Avery	14-28		4	Own	4-4 1/2 x 7	G,K,D	3-4									Steady Pull. .	12-24	1485	4		4-4 x 5	Gas.	3	
Avery	18-36		4	Own	4-5 1/2 x 6	G,K,D	4-5	LaCrosse. M	6-12	900	4	Own	2-4 x 6	G,K	1	Stinson. . . 4E	18-36	1335	4	Beav.	4-4 1/2 x 6	G,K	4	
Avery	25-50		4	Own	4-6 1/2 x 7	G,H,D	5-6	LaCrosse. G	12-24	1250	4	Own	2-6 x 7	GorK	3	Stone	20-40	2250	4	Beav.	4-4 1/2 x 6	G,K	4	
Avery	45-65		4	Own	4-7 1/2 x 8	G,K,D	8-10	Lauson.	12-25	1495	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3									
Bates	15-25		4	Own	4-4 1/2 x 6	Ker.	3	Lauson.	15-25	1685	4	Beav.	4-4 1/2 x 6	GorK	3-4	Tioga. 3	15-27	2625	4	Wisc.	4-4 1/2 x 6	Gas.	3-4	
Bates Mule. H	15-25		4	Midw	4-4 1/2 x 5 1/2	Gas.	3	Lauson. 21	15-30	1985	4	Beav.	4-4 1/2 x 6	GorK	3-4	Titan	10-20	1060	4	Own	2-6 1/2 x 8	G,K,D	3	
Bates Mule. F	18-25		*2	Midw	4-4 1/2 x 5 1/2	Gas.	3	Leader. B	12-18	1995	4	Own	2-6 x 6 1/2	G,K,D	2-3	Top. B	30-45	3500	4	Wauk	4-4 1/2 x 6 1/2	Gas.	3-4	
Bates Mule G	25-35		*2	Midw	4-4 1/2 x 5 1/2	Gas.	com.	Leader. N	16-32	1985	4	Clim.	4-5 x 6 1/2	G,K	3-4	Toro Cultivator	6-10		3	LeR.	4-3 1/2 x 4 1/2	Gas.	2	
Bean.	8-16		*1	Own	4-3 1/2 x 4	G.K.	2-3	Leader. GU	18-35	2775	*2	Clim.	4-5 1/2 x 6 1/2	G,K	3-4	Townsend	10-20	1200	2	Own	4-6 1/2 x 7	Ker	2-3	
Beeman. G	2-4	315	4	Own	1-3 1/2 x 4 1/2	G.K.	1/2	Leonard. E	20-30	2530	4	Buda	4-4 1/2 x 6	G,K	3	Townsend	15-30	1800	2	Own	4-7 x 8	Ker	3-4	
Best			*2	Own	4-4 1/2 x 6 1/2	G,K,D	4	Liberty. A	18-32	2475	4	Clim.	4-5 x 6 1/2	G,K	4	Townsend	25-50	3000	2	Own	4-8 1/2 x 10	Ker	4-5	
Best	60		*2	Own	4-6 1/2 x 8 1/2	G,K,D	8-9	Linn. H4J	40	4500	*Cont.	4-4 1/2 x 5 1/2	Gas	4	Traction Motor	40-50		4		8-3 1/2 x 5	Gas.	4-5		
Boring. 1921		1850	3	Wauk	4-4 1/2 x 5 1/2	GorK	4	Linn. W	60	5100	*Wauk	4-5 x 6 1/2	Gas.	6	Traylor. . . TB	6-12	715	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1		
Burn-Oil 1921	15-30	1650	4	Own	2-6 1/2 x 7	Ker.	3-4	Little Giant. B	16-22	2200	4	Own	4-4 1/2 x 5	K.	4	Triumph. . . H	18-36	2450	2	Erd.	4-4 1/2 x 6	Ker.	4	
Capital	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	Little Giant. A	26-35	3300	4	Own	4-5 1/2 x 6	K.	6	Turnar. . . 10	25-40	3750	*2	Wauk	4-5 x 6 1/2	GorK	4	
Case	10-18	1090	4	Own	4-3 1/2 x 5	GorK.	2	Lombard	85-150		*2		6-5 1/2 x 6 1/2	Gas.	16	Turner. 1921	14-25	1295	4	Buda	4-4 1/2 x 5 1/2	G,K	3	
Case	15-27	1680	4	Own	4-4 1/2 x 6	GorK	3	Lombard	50				4-4 1/2 x 6 1/2	Gas.	6-10	Twin City.	12-20		4	Own	4-4 1/2 x 6	G,K	3	
Case	22-40	3100	4	Own	4-5 1/2 x 6 1/2	GorK	4-5	Magnet. . . . B	14-28	1875	4	Wauk	4-4 1/2 x 6 1/2	K&G	3	Twin City.	20-35		4	Own	4-4 1/2 x 6 1/2	G,K	5	
Caterpillar T11	25		*2	Own	4-4 1/2 x 6	Gas.	4	Master Jr	5-10	585	2	LeR.	2-2 1/2 x 4	Gas.	1	Twin City.	40-65		4	Own	4-7 1/2 x 9	G,K	8	
Caterpillar T16	40		*2	Own	4-6 1/2 x 7	Gas.	6	Merry Gar1921	2	230	2	Evin	1-2 1/2 x 2 1/2	Gas.	3-4	Uncle Sam C20	12-20	1385	4	Weid.	4-4 x 5 1/2	G	2-3	
Centaur	5 2 1/2	455	2	N Way	2-4 1/2 x 3 1/2	GorK	1-9	Minne. All-P	12-25	1200	4	Own	4-4 1/2 x 7	GorK	3	Uncle Sam B19	20-30	2300	4	Beav.	4-4 1/2 x 6	GorK	3-4	
Chase	12-25	2100	3	Buda	4-4 1/2 x 5 1/2	GorK	2-3	Minne. Gen.P	17-30	1800	4	Own	4-4 1/2 x 7	GorK	3-4	Uncle Sam D21	20-30	1985	4	Beav.	4-4 1/2 x 6	GorK	3-4	
Chicago	40	2500	4	Own	4-4 1/2 x 6	Gas.	4	Minne.							Universal.	1-4	475	2	Own	1-3 1/2 x 5	G	1		
Cletrac. W	12-20	1495	*2	Own	4-4 x 5 1/2	G,K,D	2-3	Med.Duty	22-44	3300	4	Own	4-6 x 7	GorK	5-6	Utilitor. . . 501	2 1/2-4	380	4	Own	1-3 1/2 x 4 1/2	G	5-6	
Dakota. . . . A	15-27	1750	3	Dom.	4-4 1/2 x 6	Gas.	3	Minne.																
Dart. B.J.	15-30	2100	4	Buda	4-4 1/2 x 6	Gas.	3-4	HeavyDuty	35-70	4600	4	Own	4-7 1/2 x 9	GorK	8-9	Velie. Biltwel	12-24	1750	4	Own	4-4 1/2 x 5 1/2	G,K,D	3	
Depue. A	20-30	2500	4	Buda	4-4 1/2 x 6	Gas.	3	Mohawk 1921	8-16	785	4	Light	4-3 1/2 x 4 1/2	KorG.	1-2	Victory. . . 1921	9-18	1350	4	Gray	4-3 1/2 x 5	Gas.	2	
Dill. D	20	2480	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	Meline Univ D	9-18	1075	2	Own	4-3 1/2 x 5	Gas.	2-3	Victory. . . 1921	15-30	1750	4	Wauk	4-4 1/2 x 5 1/2	Gas.	3	
Dill. R.W.	20	2980	4	Midw.	4-4 1/2 x 6	Gas.	3	Moline Orch.	9-18	1075	2	Own	4-3 1/2 x 5	Gas.	2-3	Vim.	15-30	1650	4	Wauk	4-4 1/2 x 5 1/2	G,K	3	
Do-It-All.	-7	595		Own	1-4 1/2 x 5	Gas.		Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	3-4	Wallis. K	15-25	1600	4	Own	4-4 1/2 x 5 1/2	G,K	3	
								Motos	15-30	2250	4	Buda	4-4 1/2 x 6	Gas.	3-4	Waterloo. N	12-25		4	Own	2-6 1/2 x 7	G,K	3	
Eagle. F	12-22	1390	4	Own	2-7 x 8	GorK	3-4	NB	1	6	425	4	Own	2-3 1/4 x 4	Gas.	3 1/2	Weebest. . . 53	28-53	5250	*2	Wisc.	4-5 1/2 x 7	G,D	6
Eagle. F	16-30	1850	4	Own	2-8 x 8	GorK	4-5	NB	3	6	425	4	Own	2-3 1/4 x 4	Gas.	3 1/2	Wellington. B	12-22	900	4	Erd.	4-4 x 6	Ker.	2-3
E-B. AA	12-20	1445	4	Own	4-4 1/2 x 5	GorK	3	Nichols-Shep.	20-42	3100	4	Own	8 x 10	GorK	3-6	Wellington. F	16-30	1400	4	Chief	4-4 1/2 x 6	Ker.	3-4	
E-B. Q	12-20	925	4	Own	4-4 1/2 x 5	GorK	3	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Western. 1920	16-32	2100	4	Clim.	4-5 1/2 x 6	Gas.	4	
E-B. Q	16-32	2000	4	Own	4-5 1/2 x 7	GorK	4	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Wetmore.	12-25	1650	4	Wauk	4-4 x 5 1/2	G,K	3	
Evans	18-30	2000	4	Buda	4-4 1/2 x 6	G.K	3	Nilson Jr. E	15-25	1775	4	Wauk	4-4 1/2 x 5 1/2	GorK	4	Wharton. . . T	12-20	1800	3	Buda	4-4 1/2 x 5 1/2	Gas.	2	
								Nilson Senior	20-40	1885	5	Wauk	4-5 x 6 1/2	G,K	4	Whitney. . .	9-18	1175	4	Own	2-5 1/2 x 6 1/2	Gas.	2	
Fageol. . . . D	9-12	1525	4	Lye.	4-3 1/2 x 5	Gas.	2	Oil Pull. . . K	12-20															

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Toronto, Canada	Motor Car Festival	Aug. 10 to 13
Denver	National Motor Show	Aug. 27
Indianapolis	Automobile and Accessory Show	Sept. 6-10
Cincinnati	Fall Automobile Show	Oct. 1-8
Olympia, England	Automobile Show	Nov. 3-12
Chicago	Automotive Equipment Show	Nov. 14-19
New York	Automobile Salon	Nov. 27-Dec. 3
Chicago	Automobile Salon	January, 1922
New York	National Automobile Show	Jan. 7-13, 1922
Chicago	National Automobile Show	Jan. 28-Feb. 3, 1922
Minneapolis	Tractor Show	Jan. 30 to Feb. 4, inclusive

RACES

Detroit, Mich.	Pikes Association Tour, Michigan and Ontario	July 9-24
Le Mans	French Grand Prix	July 25
Cotati, Calif.	Opening of New Speedway	August 14
Pikes Peak	Hill Climb	September 5
Uniontown Speedway	Annual Autumn Classic	September 5
Los Angeles	Speedway Race	November 24

FOREIGN SHOWS

Buenos Aires, Argentina	Passenger Cars and Equipment	September
Luxemburg	Luxemburg Agricultural Sample Exhibition	September
Paris, France	Paris Motor Show	October 5-16
London	British Motor Show, Society Motor Mfgs. and Traders	Nov. 4-12

CONVENTIONS

Coden, Ala.	Midsummer Meeting of Alabama Automobile Dealers' Ass'n	July 25-26
Chicago	Twenty-eighth Annual Convention National Implement & Vehicle Association	Oct. 12-24
Cleveland	National Tire Dealers' Association	November
New York	Service Managers Convention	Nov. 22-24

Business Notes

Van Wheel Corp., Syracuse, N. Y., has been reorganized and is getting ready to go ahead in a much larger way. The new officers of the corporation consist of T. G. Meacham, president; J. W. Vanderveer, vice president; and R. T. Wennstroom, treasurer and secretary. Mr. Meacham was formerly vice president and general manager of the New Process Gear Corp. of Syracuse, now the New Process Gear Division of the Willys Corp.

Highway Trailer Co., Edgerton, Wis., intends to begin work within a few days on the reconstruction of its main shop building, which was almost totally destroyed by fire on the night of July 4, causing a loss estimated at \$260,000, with insurance of about \$90,000.

McAvoy Mfg. Co., Racine, Wis., a pioneer manufacturer of winter tops for passenger cars, bodies, trimming, curtains, etc., has incorporated its business as the Wisconsin Top Co., Inc., with a capital stock of \$200,000. The incorporators are C. V. McAvoy, L. M. Johnston and A. M. Kalamatiano.

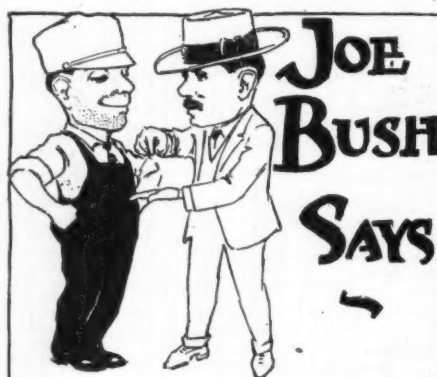
March Motors Co., Milwaukee, for many years distributor of the Mitchell, has been discontinued, following the recent death of Alton J. March, president and general manager. The building has been taken over by the Milwaukee Oldsmobile Sales Co., Oldsmobile dealer in Milwaukee county and vicinity. The Mitchell is temporarily without dealer and distributor representation in Milwaukee and Wisconsin, save a direct factory operation.

A. H. Peterson Mfg. Co., manufacturer of tools and dies, is discontinuing this line and will concentrate on the manufacture of portable electric drills and similar equipment for automobile shops, garages, machine works, etc. The plant is being retooled and a regular production schedule will be resumed about Aug. 1 or 15, with 200 operatives.

Stratton-Bliss Co. holding Dodge Brothers' franchise in New York City has discontinued its contract for the Elsey Motor Co. which handles the Dodge car in the Bronx. Its sales and service branch will be at 2938 Grand Concourse. Charles J. Quinn who has been with the headquarters sales department of Stratton-Bliss on Broadway has been made manager of the branch.

Jawn D. Takes 28 Per Cent Gasoline Cut Since Jan. 1

New York, July 16—Wholesale prices on gasoline have now decreased about 28 per cent since Jan. 1, the price in 30 principal cities averaging today 21.1 cents a gallon. The lowest quotation is 15 cents at Kansas City, Mo., and the highest 26 cents at Seattle. Prices have



SERVICE willingly given
brings Willie back
with more business.

declined only 2 cents a gallon in California and Washington since Jan. 1.

The New York wholesale price today is 24 cents, a drop of 7 cents since Jan. 1. In San Francisco the price is 25 cents, a 2-cent drop. Chicago is selling at 18 cents, New Orleans at 19.5, a 9-cent drop in each case. Prices are consistently lower in the middle west cities than in cities along the seaboard.

Industry Labors to Bring Maker and Dealer Closer

Buffalo, July 16—Several subjects of interest to the industry were discussed by directors of the National Automobile Chamber of Commerce at a recent meeting here. One of them concerned the necessity for a greater degree of co-operation between automobile dealers throughout the country. In this connection a report was made on the conference between committees representing the N. A. C. C. and the N. A. D. A.

Directors were asked to adopt a definite plan for cooperation with Secretary of Commerce Hoover, in assembling industrial statistics and promoting foreign trade.

The directors also took up the program for promoting "safety first" plans on a national scale including the use of a \$5,000 fund to be given in prizes to school children for essays.

Alfred Reeves, general manager, stated the reports submitted at the meeting showed that the automobile business is 10 per cent better off than any other industry.

Directors who attended the meeting were R. E. Olds, Charles D. Hastings, Alvin Manley, A. J. Brosseau, John N. Willys, H. H. Rice, H. M. Jewett, W. L. Pulcher, Thomas Henderson, J. Walter Drake, W. E. Metzger, Roy D. Chapin and C. C. Hench.

URGES IMMEDIATE ACTION

New York, July 16—The National Automobile Chamber of Commerce has requested members to communicate with the House Ways and Means Committee at Washington, urging approval of the Graham resolution. The resolution imposes a 300 per cent duty upon re-imported material originally designed for use by the American Expeditionary Forces. Passage of the resolution is declared by the chamber to offer the quickest means of relief from dumping of war trucks.

STATE CHAMBER MEETS JULY 29

Seattle, July 16—P. F. Drury, assistant manager and secretary of the National Automobile Chamber of Commerce, will be the chief speaker at the annual convention of the Washington State Automobile Chamber of Commerce, the recognized organization of the automobile industry of the state, to be held in Spokane July 29-30. Between 300 and 400 automobile men are expected to attend the convention. Mr. Drury's subject will be "The Automobile Industry and Its Needs Today."